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Infantry Training

Volume I

INFANTRY PLATOON WEAPONS

PAMPHLET No. 6B

THE GENERAL PURPOSE MACHINE GUN

(SUSTAINED FIRE ROLE)

(ALL ARMS)

1968

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for the General Purpose Machine Gun, 1962 (Army Code No. 9802), Parts II
and III.

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*Prepared under the direction of
The Chief of the General Staff*

MINISTRY OF DEFENCE,
November, 1968.

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A

Tripod sight bracket.
Rear mounting pin.
Fire control charts.
Range tables.

One holdall, containing:

Two sustained fire barrels.
Spare return spring.
Dial sight and case.
Three pegs, tripod marker.
Two aiming posts.

Ammunition

6. The first line ammunition for the sustained fire role is 5,000 rounds. The section commander is to draw sufficient ammunition to meet immediate needs, but should bear in mind that the gun team will not be able to carry more than six belt boxes, in addition to the conversion kit. Extra ammunition will have to be taken to the gun position by the rifle group, by another section, or by vehicle.



Fig 1.—The sustained fire conversion kit

LESSON 1.—THE TRIPOD

Aim

7. To teach the drill for mounting and dismounting the gun in the sustained fire role on even and uneven ground, and behind various types of cover.

Stores

8. Guns, conversion kits, drill belts and belt boxes.

Preliminaries

9. Safety precautions. Mount one tripod.

Instructor's notes

10. a. Ground must be selected that gives a wide range of problems for practice.

b. Practice should be given in mounting the gun behind cover. After mounting, all the squad should check the amount of exposure by moving forward to view from the front. During mounting, the rest of the squad should act as critics.

c. Two periods are required to teach this lesson.

d. Use of the dial sight is taught in a later lesson. Instructors should not teach more than the simple fixing and removal of the sight during this period.

Approach

11. Give the aim of the lesson.

Description of the tripod

12. Explain:

a. The tripod legs are held in position by clutch plates and secured by clamp levers. On the bracket at the pivot point of the legs there is a direction dial. The markings on the direction dial are not used and should be ignored.

b. A cradle is fitted to the bracket by a ball and socket joint. This is secured by the cradle locking lever. The cradle is buffered to absorb the recoil of the gun during firing. The gun is secured to the forward end of the cradle by a mounting pin. The rear mounting pin is fitted into the gun and engages into a slot in the rear mounting seating of the cradle.

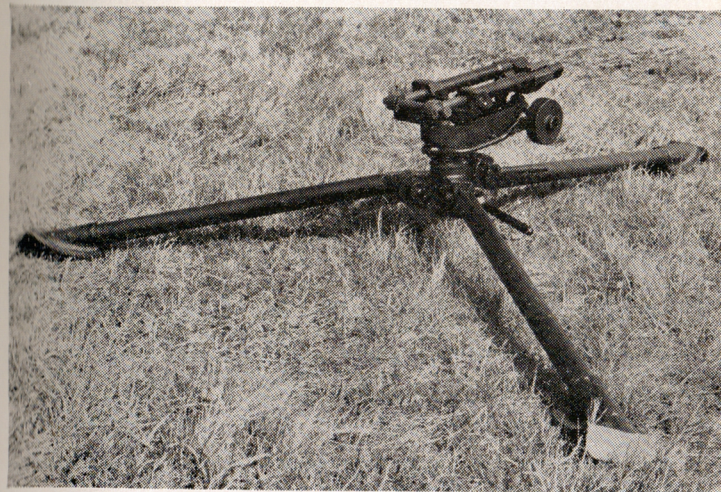
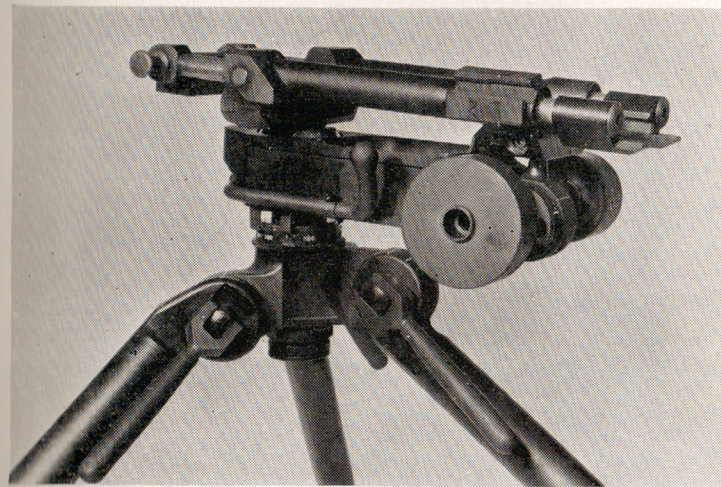


Fig 2.—The tripod

c. A deflection drum is fitted to the right rear of the cradle; it is used to obtain adjustment in direction. When the drum is pulled outwards, the clicking device is brought into operation; each click is equal to two mils. When the drum is pushed inwards, the clicking device is taken out of operation.

d. Adjustments for elevation are obtained by rotating the elevation drum on the left rear of the cradle. The lock lever must first be released.

e. On the left bar of the cradle there is a dovetailed slot to take the tripod sight bracket.

13. Question the squad.

Mounting the tripod on even ground

14. Explain and demonstrate:

The No. 2 prepares the tripod. To do so:

a. Withdraw the tripod from the holdall. With the tripod legs to the rear, straddle the tripod. Grasp the front bar of the cradle and lift the tripod so that the legs are vertical. Grip the cradle between the thighs and unlock both clamp levers (see Fig 3). Lower the tripod to the ground. At the same time swing both legs forward (see Fig 3) until they are in a low mount position, as indicated by the lower of two mounting lines on the tripod bracket, and lock the levers. Ensure that the rear or long leg is also in the low mount position.

b. Release the cradle locking lever, and lift the rear of the cradle upwards until horizontal. Secure the locking lever and pull out the front mounting pin. If necessary, rotate the deflection drum until the elevating gear is central on the traversing bar, and rotate the elevating drum until the small stud is in the centre of its slot.

(1) At all times the direction dial on the head of the tripod must be level.

(2) The long leg of the tripod should be to the rear, except when the tripod is mounted on a forward slope, or on the side of a bank, when the long leg should be pointed down the slope.

c. Fit the tripod sight bracket by unscrewing the wing nut and sliding the bracket on from the rear. Ensure it is fully forward, and tighten the wing nut.

d. Position the belt box on the left of the tripod, with the quick release catch of the lid towards the tripod.

e. Position the dial sight box on the left of the tripod.



Fig 3.—Mounting the tripod

f. Remove the aiming post from the holdall and erect it about five to ten metres from the gun near to the gun's left or right of arc. Fix the aiming lamp to the top of the post (*see* Fig 4).



Fig 4.—Aiming post and lamp

Dismounting the tripod

15. Explain and demonstrate:

a. The No. 2 is to dismount the tripod. Remove the tripod sight bracket by unscrewing the wing nut, and slide off. Push in the front mounting pin. Ensure that the long leg is in the low mount position. Release the cradle locking lever. Depress the rear of the cradle and lock above the long leg.

b. Straddle the tripod and grasp the front bar of the cradle. Unlock the front leg clamp levers. Raise the tripod to the vertical position, allowing the legs to drop. Grip the cradle between the knees. Ensure that both front legs are in line with the rear or long leg and clamp firmly. If the tripod is not required for further use, return the tripod to its holdall.

c. Recover and replace the aiming post and lamp in the holdalls.

16. Practise the squad, making sure that the last man leaves the tripod mounted. Words of command to be used are "*Mount*" and "*Dismount tripod*".

Mounting the gun on even ground

17. Explain and demonstrate:

The gunner is to mount the gun. To do so:

a. Cock the gun and remove the light role barrel; fit a sustained fire barrel, having checked that the gas regulator is set correctly; operate the trigger. Remove the butt and fit the recoil buffer, ensuring that the catch is properly engaged. Close the ejection cover. Fit the rear mounting pin (if not already fitted). Lift the gun and, ensuring that the flat surfaces on the rear mounting pin are correctly positioned, push the gun fully forward and insert the front mounting pin (*see* Fig 6.a.); fold and lock the bipod legs.

b. Remove the dial sight (*see* Fig 5) from its box, and fit the sight by inserting the sight bracket into the tripod bracket; press down on the sight catch, and push the sight fully home. When the gun is mounted:

(1) Check that the direction dial is level, and stamp in the tripod shoes, placing sandbags or pieces of turf on the legs to ensure stability.

(2) Make certain that the gun is mounted as low as possible, consistent with obtaining good observation of the target area. To check that the fire will clear the crest of the cover, lower the head until the eye can follow the line of the barrel.

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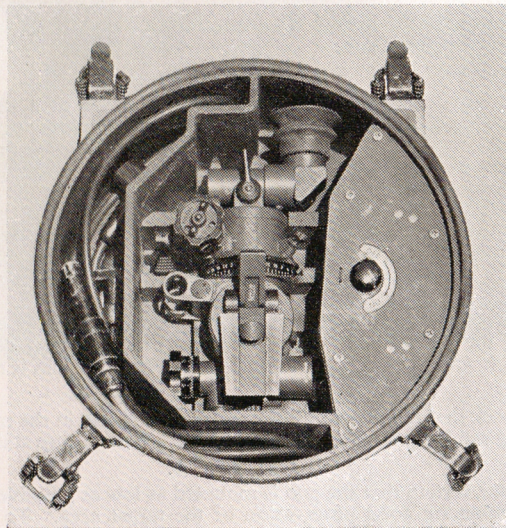
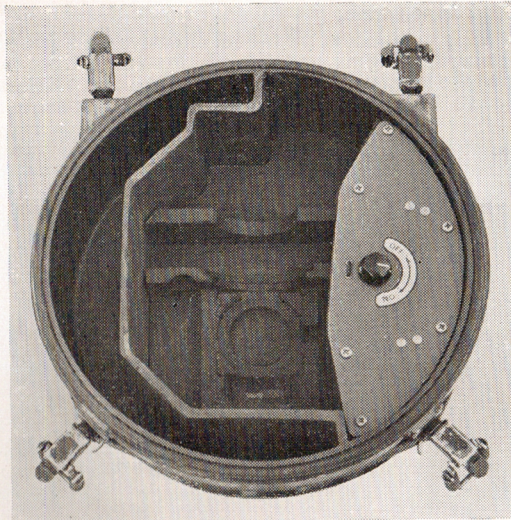


Fig 5.—Dial sight packing

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Fig 6.—Mounting the gun

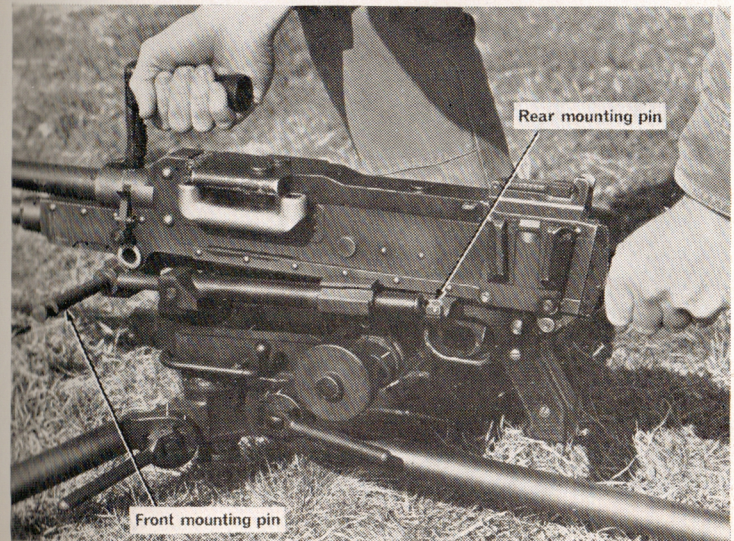


Fig 6 a. Front and rear mounting pins

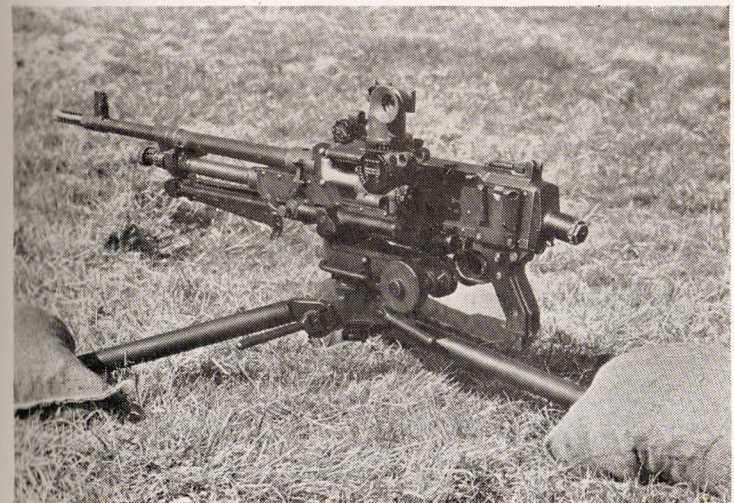


Fig 6 b. Low mount

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Fig 6 c. High mount



Fig 6 d. Side slope

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Fig 6 e. Forward slope

Dismounting the gun and tripod**18. Explain and demonstrate:**

The gunner is to dismount the gun. To do so:

Ensure that the gun is unloaded. Remove the dial sight by pressing down on the sight catch, and lift up the sight; replace it in its box. Release the bipod legs and pull out the front mounting pin. Draw the gun off the tripod to the rear. If the gun is to be fired in the light role, replace the light role barrel and butt, and remove the rear mounting pin. Return the barrel, the recoil buffer and the rear mounting pin to the holdalls.

The No. 2 then dismounts the tripod as taught.

19. Explain and demonstrate how the sight is fitted into its container.

20. Practise the squad in pairs, using different types of ground and cover, and making sure that the last pairs leave the guns and tripods mounted. Words of command to use are "*Mount gun and tripod*" and "*Dismount gun and tripod*".

Loading and position of gun numbers**21. Explain and demonstrate as necessary:**

a. Ammunition to be used in the sustained fire role will be in belt boxes.

b. The gunner is to adopt a position to the left rear of the gun—left hand on the pistol grip, right hand on the deflection drum. The No. 2 should place himself on the left of the gunner, where he can best perform such duties as loading, observing fire, etc. (see Fig. 7).

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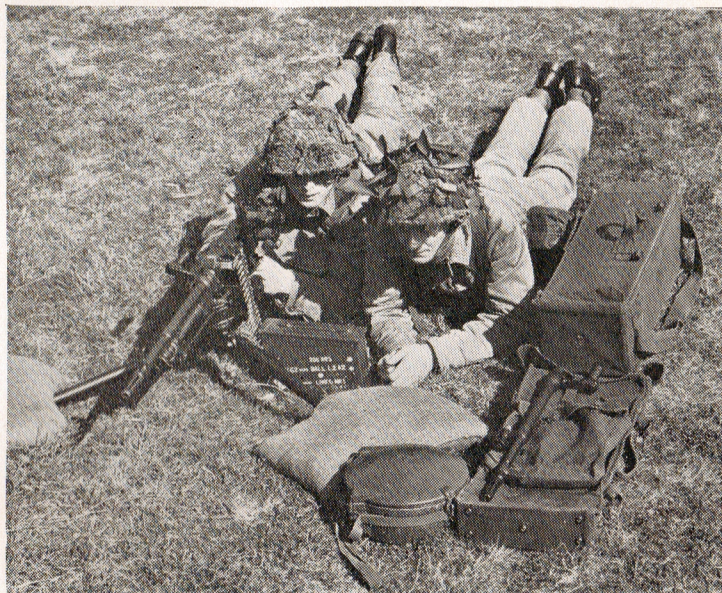


Fig 7.—Loading position

- c. The gun numbers must at all times adopt positions which will offer a minimum of exposure.
- d. Loading will be as already taught for the light role.

Unloading

22. Explain and demonstrate:

On the command "*Unload—clear gun*", lower the sight if necessary, then carry out the actions as taught. No. 2 is to replace the belt in the box and secure the lid. Both numbers stand up, and the gunner reports "*Gun clear*". The gun must always be unloaded before it is removed from the tripod.

23. Practise the squad on various types of ground and cover.

Conclusion

24. Questions from and to the squad.
25. Sum up.

LESSON 2.—SIGHTSETTING, AIMING AND FIRING

Aim

26. To teach the drill for sightsetting, aiming and firing.

Stores

27. Guns, conversion kits, drill belts, belt boxes and landscape or natural targets.

Preliminaries

28. Safety precautions. Order guns to be mounted and loaded. Point out targets.

Approach

29. Give the aim of the lesson.

Sightsetting

30. Explain and demonstrate:

a. For ranges between 800 and 1,800 metres, the backsight (*see* Fig 8) is raised to the vertical position. Graduations are of 100 metres up to 1,800 metres; however, the sight can be set accurately to the nearest 50 metres. When the backsight is being used in the vertical position, it will be necessary to lower the leaf during any action which requires the top cover to be raised.

b. On the range being ordered, the gunner is to set the sights as taught, cock the gun, and put the safety catch to "S".

Aiming—rough alignment

31. Explain and demonstrate:

When the target is indicated, the gunner calls "*Unlock*". The No. 2 unlocks the cradle locking lever. The gunner roughly aligns the sights on to the target. When he is satisfied that his aim is approximately on the target, he calls out "*Lock*". The No. 2 then pushes the locking lever fully home.

Fine adjustment—elevation

32. To elevate or depress the gun, the gunner releases the lock lever and rotates the elevating drum until the sights are in line for elevation, then tightens the lock lever.

Fine adjustment—direction

33. Push in the deflection drum and turn the drum until the sights are in line for direction. It may be necessary at this stage to make a final adjustment for elevation. When the gunner is satisfied that the aim is correct, he is to pull out the deflection drum and report "*On*".

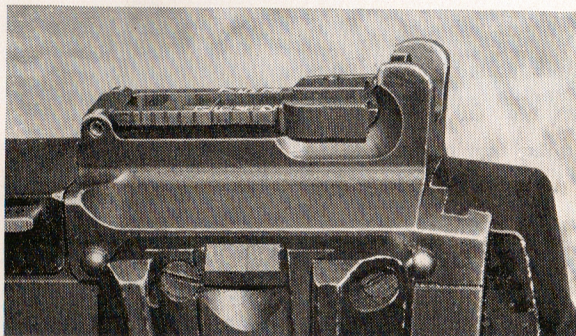
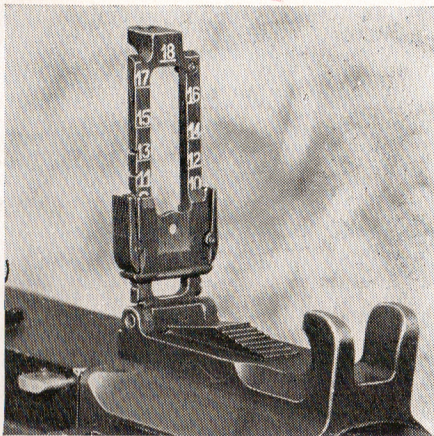


Fig 8.—Backsight

34. Practise the squad.

Length of burst

35. Explain:

- a. The normal length of burst is 20 rounds. This is necessary to ensure a close pattern of shots in the beaten zone.
- b. If shorter bursts are employed, the length of the burst should not be less than 10 rounds.

c. The normal rate of fire is **about** half a belt (100 rounds) per minute.

d. The rapid rate of fire is **about** one belt (200 rounds) per minute.

e. The above maximum length of burst and rate of fire are never to be exceeded.

36. Questions as necessary.

Firing

37. Explain and demonstrate:

When the gunner has reported "*On*", and received the order to fire, in doing so he should use only the left forefinger on the trigger and the thumb behind the pistol grip (see Fig 9), in order not to influence the movement of the gun. He should move his head to one side of the sight, so that he can observe the tracer and strike, fire the length of burst required, check aim, and correct if necessary. He should then repeat this procedure.

38. Practise the squad.



Fig. 9—Correct firing position of left hand

Barrel changing

39. Explain and demonstrate:

a. If fire has to be delivered for long periods, whether at the normal or the rapid rate, the barrel ~~should~~ ^{is to} be changed after every second belt.

b. When the No. 2 has clipped on the second belt, he warns the gunner "Barrel". He then prepares the new barrel for use and checks that ~~the~~ ^{ga} there is no obstruction in the barrel and that the gas regulator is correctly set, as taught.

c. When the belt has been expended, or at a convenient opportunity, the gunner ~~clears~~ the gun, cocks the gun, and orders "Barrel". The No. 2 then changes the barrel.

d. The gunner allows the working parts to go forward, reloads, cocks the gun, and carries on firing.

40. e. In training, if continuous fire of more than 800 rounds is required, extra barrels are to be used. These barrels are to be used in rotation with the two belonging to the gun being fired.

f. To avoid overheating and consequent dangerous stoppages, once any barrel has been used it is not to be replaced on the gun until it is cool enough to be held in the bare hand without discomfort.

41. Questions from and to the squad.

42. Sum up.

PRACTICE 1.—THE TRIPOD, AIMING AND FIRING**Aim**

43. To give men more practice at handling the tripod, aiming, sightsetting, and firing the gun from various types of cover.

Stores

44. Guns, conversion kits, drill belts, belt boxes, targets, target indicator.

Instructor's notes

45. Choose ground with various types of cover. If you have to take this period indoors, improvise fire positions and use landscape targets. Check for crest clearance in all positions.

Preliminaries

46. Safety precautions. Point out targets.

Practice

47. Divide the squad into gun teams, and use those who are not practising to criticize the handling, fieldcraft and selection of positions of those who are; send some of them forward to observe from the enemy's point of view. Practice should be conducted on the following lines:

a. Get the gun team to mount the gun and tripod for firing from all types of cover.

b. Point out a target and get the gun team to set the sights, aim and fire from their selected positions.

c. Give orders to effect barrel changing.

Competitions

48. Tell the men the standard required to pass the training test. Organize simple competitions based on the training tests.

Summary

49. Summarize progress made.

Barrel changing

39. Explain and demonstrate:

- a. If fire has to be delivered for long periods, whether at the normal or the rapid rate, the barrel ~~should~~ ^{is to} be changed after every second belt.
- b. When the No. 2 has clipped on the second belt, he warns the gunner "Barrel". He then prepares the new barrel for use and checks that ~~the~~ ^{gas} there is no obstruction in the barrel and that the gas regulator is correctly set, as taught.
- c. When the belt has been expended, or at a convenient opportunity, the gunner ~~clears~~ the gun, cocks the gun, and orders "Barrel". The No. 2 then changes the barrel.
- d. The gunner allows the working parts to go forward, reloads, cocks the gun, and carries on firing.

40. Practise the squad.

Conclusion

41. Questions from and to the squad.
42. Sum up.

PRACTICE 1.—THE TRIPOD, AIMING AND FIRING**Aim**

43. To give men more practice at handling the tripod, aiming, sightsetting, and firing the gun from various types of cover.

Stores

44. Guns, conversion kits, drill belts, belt boxes, targets, target indicator.

Instructor's notes

If you have to take this
ndscape targets. Check for

46. Safety precautions. Point out targets.

Practice

47. Divide the squad into gun teams, and use those who are not practising to criticize the handling, fieldcraft and selection of positions of those who are; send some of them forward to observe from the enemy's point of view. Practice should be conducted on the following lines:

- a. Get the gun team to mount the gun and tripod for firing from all types of cover.
- b. Point out a target and get the gun team to set the sights, aim and fire from their selected positions.
- c. Give orders to effect barrel changing.

Competitions

48. Tell the men the standard required to pass the training test. Organize simple competitions based on the training tests.

Summary

49. Summarize progress made.

LESSON 3.—APPLICATION OF FIRE CONTROL ORDERS

Aim

50. To teach the soldier how to act on the various parts of a fire control order.

Periods

51. Two 45-minute periods are required to teach this lesson. They should be followed by practice periods as necessary.

Stores

52. Guns, conversion kits, drill belts, belt boxes, landscape or natural targets, blackboard, hand angle scale (see Annex D).

Instructor's notes

53. a. Lesson 5 of Infantry Training, Volume I—Infantry Platoon Weapons, Pamphlet No. 2—Fieldcraft (All Arms), 1954 (Army Code No. 8890), should have been taught before this lesson.

b. The instructor should select targets of various types and decide on ranges before the lesson begins.

c. When gun teams are well practised in the basic handling drills described in this pamphlet, and are working together with the gun in the SF role for long periods, it is possible to reduce the number of orders from the gun controller and replies from the gunner, whose actions however remain unchanged. For instance, the orders given for a correction of fire, as taught in this lesson (para 67), would normally be given in three parts, eg, "Stop"—pause till gunner reports "On"—"Add 200"—pause till gunner reports "On"—"Go on". With a well practised team the gun controller can order "Stop, add 200, go on" without pauses or replies.

Preliminaries

54. a. Safety precautions.

b. Order the guns to be mounted facing the arc; load.

c. Organize the arc of fire and order gun teams to rejoin the squad.

Approach

55. Give the aim of the lesson. Explain that whenever possible the gun controller will lay the gun himself and give a brief description of the target and point of aim to the gunner. On occasions, the gun controller may be detached from the gun team, and therefore a fire control order must be given. The No. 2 must at all times know the target and the range setting.

Target indication

56. Revise Lesson 5 of Infantry Training, Volume I, Pamphlet No. 2.

Mils measurement

57. Explain that, at long ranges, the angle in mils from a reference point to the target may be given. Gun numbers must be able to measure these distances by using hand angles. Each man must know the number of mils spanned by the different parts of his hand when the arm is outstretched (see Fig 10). Check the hand angles of each member of the squad, using the prepared scale.

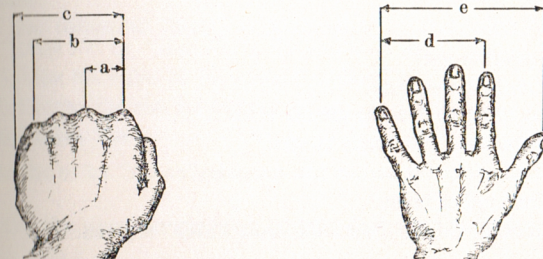


Fig 10.—Hand angles—useful measurements

Fire control orders

58. Explain and demonstrate:

To ensure that the gunner understands and reacts quickly to the fire control order, it is always given in a set sequence; the sequence and the gunner's consequent actions are:

Order	Action by gunner
a. Group (gunner).	a. Is alerted for orders.
b. Range.	b. Sets sights, cocks gun, and applies the safety catch.
c. Indication followed by "Lay".	c. Recognizes the target, lays the gun on to the target, and reports "On".
d. Type of, and order to, fire.	d. (1) If "Rapid" is ordered, prepares to fire rapid. (2) If the rate is not mentioned, prepares to fire at the normal rate. (3) Operates the trigger.

59. Explain that if at any time the gunner fails to understand an order he is to call "Again".

60. Practise the squad.

Types of target

61. Explain that there are two basic types of target which are engaged by the gun in the sustained fire role. These are:

- a. *Point targets*—targets which appear to have no width, such as a bush or the base of a tree.
- b. *Traversing targets*—targets which have width, such as a hedgerow or the edge of a wood.

Firing drill—point targets

62. Explain and demonstrate:

- a. On the order to fire, the gunner is to:
 - (1) Fire a burst as already taught.
 - (2) Check aim, and correct it if necessary.
 - (3) Fire another burst.
 - (4) Continue this drill until the order “*Stop*” is given.
- b. On the order “*Stop*”, the gunner is to cock the gun, put the safety catch to “*S*”, ensure that his aim is correct, and report “*On*”.

63. Practise the squad.

Traversing targets

64. Explain and demonstrate:

- a. A traversing target is not normally more than 50 mils wide; it may appear to be a straight or irregular line across the front, or it may be angled away from the gun position.
- b. When a traversing target is indicated, the right and left limits are defined; the gunner will be ordered to lay on either the left or right limit.
- c. When the gun is laid, the gunner reports “*On*”. The point at which the gun is now aimed is called the **noted point of aim**.

Firing drill—traversing targets

65. Explain and demonstrate:

- a. On the order “*Traversing right/left, fire/go on*”, the gunner is to:
 - (1) Fire a burst at the noted point of aim.
 - (2) Traverse one click of the deflection drum in the direction ordered.
 - (3) Check aim for elevation, and correct as necessary.
 - (4) Fire a burst.
 - (5) Continue this drill until the order “*Stop*” is given.

b. If the order “*Stop*” is followed by “*Relay*”, the gunner is to:

- (1) Click back to his noted point of aim.
- (2) Correct his aim for elevation, if necessary.
- (3) Report “*On*”.

66. Practise the squad.

Corrections

67. Explain:

- a. If the command “*Stop*” is followed by a correction for elevation (eg, “*Drop 50*” or “*Add 100*”), the gunner is to:
 - (1) Alter his sights by the amount ordered.
 - (2) Correct the aim for elevation.
 - (3) Report “*On*”.
- b. On the order “*Go on*”, the gunner continues the firing drill.

68. Practise the squad in engaging targets; give corrections for elevation.

69. Explain:

- a. If, when engaging a point target, the first burst or bursts fall to the left or right, the gunner will receive the orders “*Stop—traversing right/left—go on*”, and, when the target has been dealt with, “*Stop*”.
- b. If the shots are missing the target to the side by a large margin, the order “*Stop—go right/left clicks*”, followed by “*Go on*”, may be given. Any small error remaining can be catered for by traversing left/right, as ordered. In these circumstances, the point of aim after the main correction is made will be the noted point of aim for that target.

70. Practise the squad in engaging point and traversing targets, giving corrections.

Conclusion

71. Questions from and to the squad.

72. Sum up.

LIVE FIRING 1.—APPLICATION OF SERVICE BURSTS, HARMONIZATION AND ENGAGEMENT OF POINT TARGETS

Aim

73. To give the gunner practice in the application of service bursts and in the drill for engaging point targets.

Stores

74. Guns, conversion kits, ammunition, harmonization targets, ochre screens with black aiming marks, 25-yard/30-metre range grouping rectangles or rulers and pencils, 27-inch rod, binoculars, cleaning kit.

Preliminaries

75. Mount guns. Remove tracer ammunition from the belts. Set the gas regulator if the setting is known, or balance the gun.

Conduct of practice

76. a. Divide the men into pairs and give practice as gunner and No. 2. Change the pairs round until all have completed the duties of a gun team.

b. For details of the practices to be fired, *see* Part II, Section 3, Practices Nos. 1 and 2.

c. If gun controllers are being exercised, practice in fire control orders can be included.

Conclusion

77. Stress the need for correct gun drills.

78. Sum up.

LESSON 4.—THE DIAL SIGHT

Aim

79. To teach the parts of the dial sight, how to manipulate them, and how to aim with the sight.

Stores

80. Guns, conversion kits, aiming lamps, and landscape or natural targets.

Instructor's notes

81. a. This lesson is written for the new dial sight, which has built-in (Trilux) illumination (*see* Annex E).

b. Details of early pattern sight illumination are given in Annex B.

c. Units should teach the sight issued.

Preliminaries

82. Safety precautions. Order guns to be mounted.

Approach

83. State the aim of the lesson.

Aiming lamp

84. The aiming lamp is made of bakelite with a glass lens at the front. It contains a Trilux element (*see* Annex E), the light from which is concentrated by the lens. Because it cannot be switched off, and its light is visible for at least 200 metres, care must be exercised in handling and siting it, so that the security of the position is not prejudiced. **No stripping of the aiming lamp is permitted.**

85. The lens of the aiming lamp, when in use, is covered by a steel cover, clipped on to the front of the lamp. The cover is hinged, and in it is cut a slot, which must be in the vertical position when the lamp is to be used. The lamp is fitted into the bracket of a clamp which has a "thumbscrew" device for securing the bracket to the aiming post, and which is hinged to allow the position of the bracket and lamp to be adjusted when they are fitted to the aiming post.

on the dial sight to the target being engaged.

The telescope

87. Explain and demonstrate:

a. This is mounted at the top of the dial sight, and can be moved up or down. When in the desired position, it can be locked by a clamp lever. The eyepiece can be rotated so that the open sight can be used for rough alignment.

A corrector to reduce laying errors is fitted to the front of the telescope.

LIVE FIRING 1.—APPLICATION OF SERVICE BURSTS, HARMONIZATION AND ENGAGEMENT OF POINT TARGETS

Aim

73. To give the gunner practice in the application of service bursts and in the drill for engaging point targets.

Stores

74. Guns, conversion kits, ammunition, harmonization targets, ochre screens with black aiming marks, 25-yard/30-metre range grouping rectangles or rulers and pencils, 27-inch rod, binoculars, cleaning kit.

Preliminaries

75. Mount guns. Remove tracer ammunition from the belts. Set the gas regulator if the setting is known, or balance the gun.

Conduct of practice

76. a. Divide the men into pairs and give practice as gunner and No. 2. Change the pairs round until all have completed the duties of a gun team.

b. For details of the practices to be fired, see Part II, Section 3, Practices Nos. 1 and 2.

c. If gun controllers are being exercised, practice in fire control orders can be included.

Conclusion

77. Stress the need for correct gun drills.

78. Sum up.

LESSON 4.—THE DIAL SIGHT

Aim

79. To teach the parts of the dial sight, how to manipulate them, and how to aim with the sight.

Stores

80. Guns, conversion kits, aiming lamps, and landscape or natural targets.

Instructor's notes

81. a. This lesson is written for the new dial sight, which has built-in (Trilux) illumination (see Annex E).

b. Details of early pattern sight illumination are given in Annex B.

c. Units should teach the sight issued.

85. Reserved.

The dial sight

86. Explain:

a. The dial sight (see Fig 11) is used to maintain elevation and direction when firing at night, or by day when the target is obscured by fog or smoke.

b. When an opportunity occurs by day, therefore, readings must be taken on the dial sight to the target being engaged.

The telescope

87. Explain and demonstrate:

a. This is mounted at the top of the dial sight, and can be moved up or down. When in the desired position, it can be locked by a clamp lever. The eyepiece can be rotated so that the open sight can be used for rough alignment.

A corrector to reduce laying errors is fitted to the front of the telescope.

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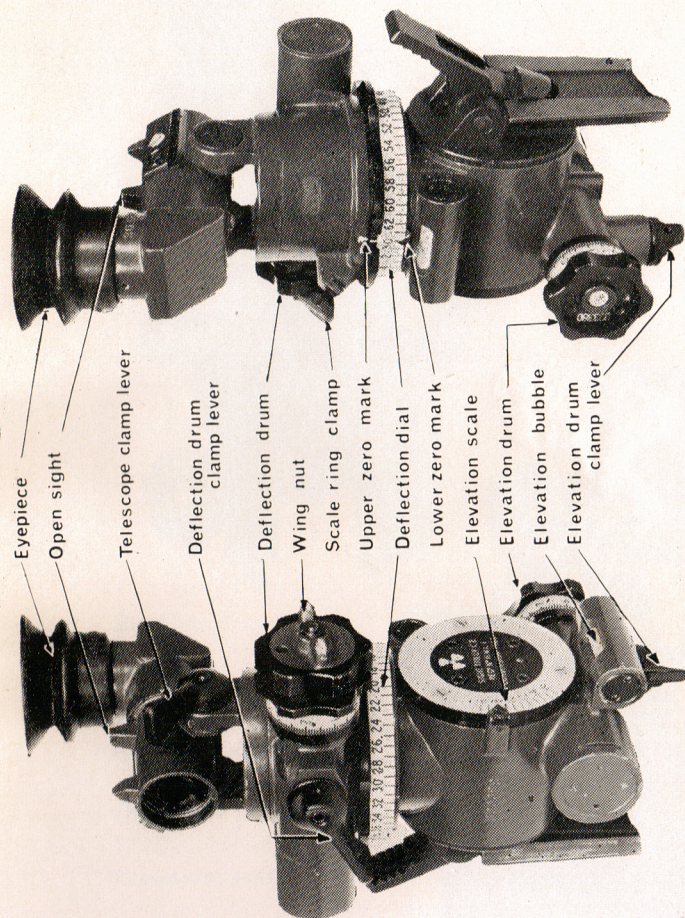


Fig 11.—Dial sight

Fig 11.—Dial sight

RESTRICTED

b. Deflection dial.

The deflection dial is graduated in hundreds of mils from 0 to 6400. It is numbered every 200 mils in a clockwise direction. The scale ring can be rotated independently by unscrewing the clamp.

On fitting the dial sight to the tripod, the scale ring must be set at zero. Unscrew the clamp and turn the scale until "0" is in line with the upper zero mark.

The lower zero mark is used to record angles of deflection over 100 mils.

e. Deflection drum.

The deflection drum is graduated in single mils from 0 to 100 and is numbered every 10 mils.

The scale ring can be moved independently by releasing the wing nut on the end of the drum. On fitting the dial sight to the tripod, the scale should always be set with "0" opposite the outer zero mark.

The inner zero mark is used to record angles of deflection, and must be read in conjunction with the deflection dial.

In front of the deflection drum is a clamp lever, which, when applied, increases the resistance of the deflection drum sufficiently to prevent movement during firing. The clamp lever is applied when it is in the raised position. It is not designed to lock the deflection drum.

d. Quick release. The quick release mechanism is locked when the deflection clamp lever is applied. The deflection dial can be rotated by unlocking the clamp lever and pushing forward the deflection drum. Care must be taken to ensure that the drum is held fully forward before rotating the dial, and that the mechanism is correctly engaged after adjustment.

88. Practise the squad in setting deflections.

Elevation scale

89. Explain and demonstrate:

a. The elevation scale is situated on the side of the sight. It is graduated from 0600 mils to 1600 mils, and is numbered every 200 mils.

b. Elevation drum. This is graduated in single mils from 0 to 100 mils and numbered every 10 mils. There is a zero mark which is used when recording angles of elevation, and it should be read in conjunction with the main scale. For settings of half mils, the zero mark should be set half way between the mil lines.

c. Below the elevation drum there is a clamp lever, which, when applied, increases the resistance of the elevation drum sufficiently to prevent movement during firing. The clamp lever is applied when it is moved to the left (ie, towards the elevation bubble). It is not designed to lock the elevation drum.

RESTRICTED

90. Practise the squad in setting elevations.

91. Point out the two levelling bubbles. Explain that the cross-levelling bubble at the rear of the sight is not used for the GPMG. The bubble on the side of the sight is used with the elevation scales to obtain the correct elevation for each task.

Aiming

92. Explain and demonstrate, with the dial sight fitted:

The telescope is used only for maintaining direction. To aim, look through the telescope with the eye close up to the rubber eyepiece, and traverse the gun until the vertical line in the telescope coincides with the centre of the vertical line on the aiming lamp.

93. Practise the squad.

Use of the dial sight

Remind the squad.

94. Explain that the dial sight enables the gun team to engage targets which have been recorded, and so deliver effective fire during darkness, smoke or fog.

95. Detail gunners and Nos. 2, and order the following actions, without explaining the reasons for them:

- a. Give a fire control order to get each gun aiming at the same target.
- b. Get the gunners to centralize the elevation bubble by turning the elevation drum on the dial sight, then check the aim through the iron sights.
- c. Next get the gunners to aim the telescope at the aiming lamp, using the quick release and the deflection drum on the dial sight.
- d. Check the centring of the elevation bubble, and then note the elevation and deflection readings on the dial sight.

96. Move the aim of the guns away from the target, and alter the readings on the dial sights and iron sights. It is important that, when this is done, the positions of the tripods, the aiming posts and lamps, and the target, all remain undisturbed.

97. Change the gun teams and order the new teams to act as follows:

- a. Set the recorded readings for elevation and deflection on to the dial sight.
- b. Unlock the cradle locking lever and roughly align the telescope, using its open sight, on to the aiming lamp. At the same time centralize the elevation bubble. Lock the cradle locking lever.

e. Use the elevation and deflection drums **on the tripod** to centralize the elevation bubble accurately, and aim the telescope at the aiming lamp.

d. Set the iron sights at the range at which they were set during the initial fire control order.

e. Check the aims through the iron sights. All gunners should find that they are now aiming again at the original target.

98. Practise the squad.

Dial sight adjustment

99. Explain and demonstrate:

- a. It may be necessary during a shoot for an alteration to be made to the dial sight reading for elevation, eg, when it is required to add 50 metres to the range.
- b. The amount of elevation in mils will be determined by the gun controller from a range table.
- c. On the order "Add" or "Drop" the required number of mils, the gunner must adjust the dial sight by the amount ordered and level the elevation bubble by using the elevation drum on the tripod.

100. Practise the squad.

Dial sight illumination

101. Explain:

No attachment is necessary for illumination of the dial sight, because scales and bubbles are illuminated from within the sight.

Conclusion

102. Questions from and to the squad.

103. Sum up.

LESSON 5.—OBSCURATION OF THE TARGET BY DAY

Aim

104. To teach the arrangements necessary to enable the target to be engaged when it is obscured.

Stores

105. Guns, conversion kits, drill belts, belt boxes.

Preliminaries

106. a. Safety precautions. Order guns to be mounted.

b. Revise Lesson 3; leave guns laid on to a target.

3 and 4

Approach

107. a. Give the aim of the lesson.

b. Explain that there is a drill required when the target is likely to be obscured (eg, by a smoke screen or by fog).

Obscuration drill—point targets

108. Explain and demonstrate:

If the target is likely to be obscured, the gun controller orders "Stop", followed by "Pick up aiming mark". On this order, the gunner is to:

a. Lay the gun on to the centre of the target.

b. Turn the elevation drum on the dial sight and level the bubble. Check the aim, and note the reading for elevation.

through the iron sights.

c. Aim at the aiming lamp with the telescopic sight, and note the readings on the deflection dial and drum and those for elevation.

d. Check the centring of the elevation bubble, and report "On".

The No.2 is to record the readings for elevation and deflection.

109. When the order "Go on" is given, normal gun drill for engaging point targets by direct means is followed. The aim on to the aiming lamp and the centring of the elevation bubble must be checked frequently.

110. Practise the squad in pairs.

Obscuration drill—traversing targets

is becoming.

111. If a traversing target becomes obscured while it is being engaged, the gun controller orders "Stop". He then gives any corrections necessary to hit the centre of the target, followed by "Pick up aiming mark". On this order, the gunner is to:

a. Lay the gun as ordered by the gun controller.

b. Carry out the drill taught in para 108. b., c. and d.

The No. 2 is to record the readings for elevation and deflection. Fire will be as directed by the gun controller.

When the target is again visible

112. Explain that when the target can again be seen, the gun controller may order "Stop" and give the necessary orders to continue firing by direct means.

113. Practise the squad in pairs.

Conclusion

114. Questions from and to the squad.

115. Sum up.

PRACTICE 2—THE DIAL SIGHT AND OBSCURATION OF THE TARGET

Aim

116. To give men more practice at handling the dial sight and in obscuration drill.

Stores

117. Guns, conversion kits, drill belts, belt boxes, landscape or natural targets.

Instructor's notes

118. If the lesson is taken out of doors, natural targets at realistic ranges should be used.

Preliminaries

119. Safety precautions. Order guns to be mounted.

Approach

120. Remind the gun teams of the need for quick and accurate handling of the dial sight during obscuration drill.

Practice

121. a. Practise the men in gun teams in the use of the dial sight during obscured shoots.

b. Give problems to the gun teams; get them to lay on a target and, once the aim and readings of the dial sight are set, unlock the cradle locking lever, move the gun off line, screen the target and, using the dial sight readings, get the gun teams to relay on the target. Check for errors.

Competitions

122. Organize simple competitions.

Summary

123. Summarize progress made.

LIVE FIRING 2.—ENGAGING TRAVERSING TARGETS AND OBSCURATION DRILL

Aim

124. To give gun teams practice in engaging traversing targets and in obscuration drill.

Stores

125. Guns, conversion kits, ammunition, harmonization targets, 25-yard/30-metre range grouping rectangles or rulers and pencils, 27-inch rod, binoculars, cleaning kit.

Preliminaries

126. Mount guns. Remove tracer from the belts. Set the gas regulator if the setting is known, or balance the gun.

Conduct of practice

127. a. Divide the men into pairs and give practice as gunner and No. 2. Change the pairs round until all have completed the duties of a gun team.

b. For details of practices to be fired, see Section 3, Practices 3 and 4.

c. If gun controllers are being exercised, practice in giving fire control orders and corrections can be included.

Conclusion

128. Stress the need for correct gun drills and careful use of the dial sight.

129. Sum up.

LESSON 6.—PREPARATION FOR NIGHT FIRING

Aim

130. To teach the drill for engaging targets at night.

Stores

131. Guns, conversion kits, drill belts, belt boxes, fire control charts.

Preliminaries

132. Safety precautions.

Approach

133. a. Give the aim of the lesson.
- b. Explain that it will soon be dark, and the gun is required to engage one or more targets during the night; preparation for this must be carried out during the daylight hours.
- c. Indicate targets to be engaged.

Preparation

134. Explain and demonstrate:
- a. Mount the gun and tripod in the selected position.
- b. When the range is ordered and the target indicated:
- (1) The gunner is to set the range on the iron sight and aim at the indicated target.
 - (2) If permission has been given to register by firing, the gun controller gives the necessary orders and subsequent corrections until fire effect is obtained.
 - (3) The gunner and No. 2 then use the dial sight and aiming lamp to take readings as taught in Lesson 5.
 - (4) The No. 2 is to record the readings for elevation and deflection.
- c. This procedure must be followed for each target indicated.
- d. The gun controller is to check and record each task.
- e. If permission to register targets by firing is not given, the procedure will be as above but omitting sub-para b. (2).
- f. Additional preparations necessary if the selected position cannot be occupied until later are explained in Annex C; these will be taught when appropriate at a later stage.
135. On the command "Load":
- a. Load as taught.

- b. The No. 2 is to ensure that all belt boxes and the holdall are within easy reach.
- c. The gunner is to fire as ordered.
- d. The drill for firing will be as for point targets.

136. Practise the squad in pairs.

Engagement of targets

137. Explain:
The gun controller must prepare a fire control chart giving details of each task.
138. Practise the squad in the engagement of targets by night from a prepared fire control chart.
139. Explain:
- a. Once the preparation for firing has been completed, the gun must never be left unattended.
 - b. Next day the gun may be removed from the tripod and used in the light role. The tripod may be left in position for further use.

Conclusion

140. Questions from and to the squad.
141. Sum up.

LESSON 7.—PREPARATION AND FIRING—FINAL PROTECTIVE FIRE TASK

Aim

142. To teach:

- a. How to lay the gun for a final protective fire (FPF) task.
- b. The actions required on the signal to open fire.

Stores

143. Guns, conversion kits, drill belts, belt boxes and fire control charts.

Instructor's notes

144. a. Areas of ground suitable for final protective fire tasks must be selected before teaching this lesson.
- b. Simple situations should be depicted and the FEBA pointed out to section commanders and gun controllers.

Preliminaries

145. a. Safety precautions.
- b. Mount guns and tripods.

Approach

146. A final protective fire (FPF) task is one where the gun is fired across the front of a forward position, laying down a belt of fire through which an attacking enemy would have to pass. This task (formerly known as a DF SOS task) is normally the gun's most important task, and the gun will be sited primarily so as to undertake it. If this is to be done efficiently, preparation and registration must be carried out in daylight. For this purpose the gun controller and section commander must know the area to be protected and the position where the gun and tripod are to be mounted.

147. For any FPF task a safety angle in front of our own troops will be ordered, depending on the ground and cover available. **The safety angle must never be less than 100 mils** and will usually be more.

Preparation

148. Explain and demonstrate:
 - a. Ensure that the gun is not loaded.

- b. Set the sights as ordered by the gun controller.
- c. Aim at the point on the FEBA from which the safety angle is to be measured.
- d. The gunner and No. 2 then use the dial sight and aiming lamp to take readings for deflection only.
- e. The section commander, gun controller and No. 2 must check the aim and reading for deflection.
- f. The section commander, on checking the deflection reading, then adds or subtracts the angle ordered for safety—**never less than 100 mils**—and orders the new reading to be set on the dial sight and the gun relaid, using the telescope and aiming lamp.
- g. When this has been done, the section commander and gun controller select a suitable area of ground where the beaten zone is to fall, and aim at that area. It may be necessary to lay off more than the prescribed safety angle, to ensure that the maximum advantage is taken of the available ground.
- h. If permission to register by firing has been given, the gun controller gives the necessary orders and subsequent corrections until the fire is falling in the desired area.
- i. The gunner is to adjust the dial sight to level the bubble, and correct his aim through the telescope. No. 2 is to record readings for direction and elevation. The section commander and gun controller check the readings, the aim through the telescopic sight and the aim through the iron sights.

149. Order "Load".

150. All members of the section must know the pre-arranged FPF signal, which indicates that fire is required at once.

151. Practise the squad in pairs.

Firing

152. Explain:
 - a. During the hours of darkness a sentry must be posted beside the gun.
 - b. The gun is to be fired only on a pre-arranged FPF signal.
 - c. When the signal is given, fire will normally be at the rapid rate. Details of signals and rates of fire will be given when sentries mount.
 - d. Barrels should be changed as taught.
 - e. The gun must be fired only at the recorded line and elevation.
 - f. The gunner must maintain a constant check on the elevation bubble and on the aim through the telescopic sight.

153. Question the squad.

Other SF tasks

154. In addition to the FPF task, the GPMG (SF) may have several other targets recorded for night firing. Unless actually engaging one of these other targets, the gun should always be aligned on to its FPF task, so that fire can be brought down immediately the signal is given.

Conclusion

155. Questions from and to the squad.

156. Sum up.

PRACTICE 3.—PREPARATION FOR NIGHT FIRING AND PROTECTIVE FIRE

Aim

157. To give the GPMG teams practice in the preparation and drills for night firing and protective fire tasks.

Stores

158. Guns, conversion kits, drill belts, belt boxes, landscape or natural targets.

Instructor's notes

159. This lesson should be taken out of doors if possible, so that a variety of tasks can be practised over different ground.

Preliminaries

160. Safety precautions.

Approach

161. Remind the gun teams of the need for great care when laying a final protective fire task during the preparation for night firing when forward troops are involved.

Practice

162. Teams are to be practised in the following:

- a. Preparation for night firing.
- b. Laying on final protective fire tasks.
- c. The reading and recording of dial sight settings.

Competitions

163. Organize simple competitions based on the training tests.

Conclusion

164. Questions from and to the squad.

165. Summarize progress made towards achieving the standard required to pass the training tests.

LIVE FIRING 3.—ENGAGEMENT OF NIGHT TARGETS

Aim

166. To give the gunner practice in the drills for the engagement of targets at night.

Stores

167. Guns, conversion kits, ammunition, harmonization targets, 25-yard/30-metre range grouping rectangles or rulers and pencils, 27-inch rod, binoculars, cleaning kit.

Preliminaries

168. Mount guns. Remove tracer from belts. Set the gas regulator if the setting is known, or balance the gun.

Conduct of practice

169. a. Divide the men into pairs and give them practice as gunner and No. 2. Change the pairs round until all have completed the duties of a gun team.
- b. For details of the practice to be fired, *see* Section 3, Practice 5.
- c. If gun controllers are being exercised, practice in fire control orders and preparation of fire control charts can be given.

Conclusion

170. Stress the need for correct gun drills, especially at night, and for accurate setting and reading of the dial sight.

171. Sum up.

LESSON 8.—TEAM HANDLING IN THE FIELD

Aim

172. To teach the soldier:
- How the gun team is organized and equipped.
 - The duties of the gun team in the attack, on reorganization and in defence.
 - Team handling in the field.

Stores

173. Guns, conversion kits, ammunition boxes containing drill belts.

Instructor's notes

174. a. The instructor must be fully conversant with Lesson 14 (Fire tasks in defence and attack).
- b. Once the lesson has begun, the instructor must adopt two roles:
- Section commander*
 - indicating targets;
 - giving imaginary errors in range and direction, in order to practise the gun controller in fire control orders;
 - giving the signal for DF and FPF tasks.
 - Instructor*—checking faults.
- c. Before this lesson the instructor must reconnoitre the ground over which he is going to instruct and exercise the squad.
- d. Supposed enemy positions must be selected, and a simple tactical situation for each team decided upon in advance.
- e. Positions for mounting the gun and tripod should also be selected, giving as wide a variety of targets as possible.
- f. Not more than two teams should be exercised at any one time. The rest of the squad should act as critics and move with the team, but should not be near enough to obstruct the team nor to give away the location of the gun position.

Preliminaries

175. Safety precautions; check stores.

Approach

176. The knowledge acquired as an individual must now be applied to handling within the team. The GPMG is used to give support to the platoon or company in both defence and attack. This lesson is concerned only with the drills and duties of the team in the attack, on reorganization after a successful action, and in defence.

Team organization

177. Explain that, when SF equipment is carried, suggested loads are as follows:

Duty in team	Equipment	Ammunition
Gun controller. Gunner.	— GPMG with light role barrel. Spare parts wallet. Small holdall. Tripod holdall.	Three 200-round belt boxes. One 200-round belt box.
No. 2.		Two 200-round belt boxes.

Notes:

- a. The man-loads here listed are given as a guide; they may be varied to suit the situation.
- b. The conversion kit and ammunition for the SF role may be brought up to the section position, or it may have to be drawn from the company headquarters.
- c. The section commander may detail other members of the section to assist in the carriage of the SF equipment, but it must be remembered that the gunner is always responsible for the gun, and that other gun numbers carry their personal weapons.

Duties

178. Explain:

In defence, the gun is usually employed from a prepared gun position, an example of which is illustrated in Fig 12. In an attack, however, and on other occasions, the gun may often have to be used from hastily-occupied and less well prepared positions; these should be as well concealed as possible, and examples of them are shown in Fig 13.

179. Organize the squad into two gun teams equipped as in para 177. Instruction should then continue as follows:

- a. The team are led by the section commander to a position behind cover near the place where the gun is to be mounted.
- b. The section commander calls for the gun controller and gunner. From a position of observation he then:
 - (1) Indicates the targets to be engaged.
 - (2) Indicates the position of friendly forces.
 - (3) Describes a simple tactical situation, involving the team in support in the attack, in a plan for reorganization, or in defence.
- c. It must be made quite clear that the task is coordinated within the company fire plan.

d. The section commander points out pre-selected positions, and orders the gun and tripod to be mounted. The gun controller must check the following points:

- (1) Exposure during mounting.
- (2) That the tripod is level, and that there is crest clearance.
- (3) That the extra ammunition has been delivered at the gun position.

e. The gun controller gives a fire control order, and practises the team in corrections, etc.

Practice

180. Practise the squad, changing gun teams, tasks and location.

181. If gun controllers are being exercised, practice in fire control orders can be given.

Conclusion

182. Questions from and to the squad.

183. Sum up.

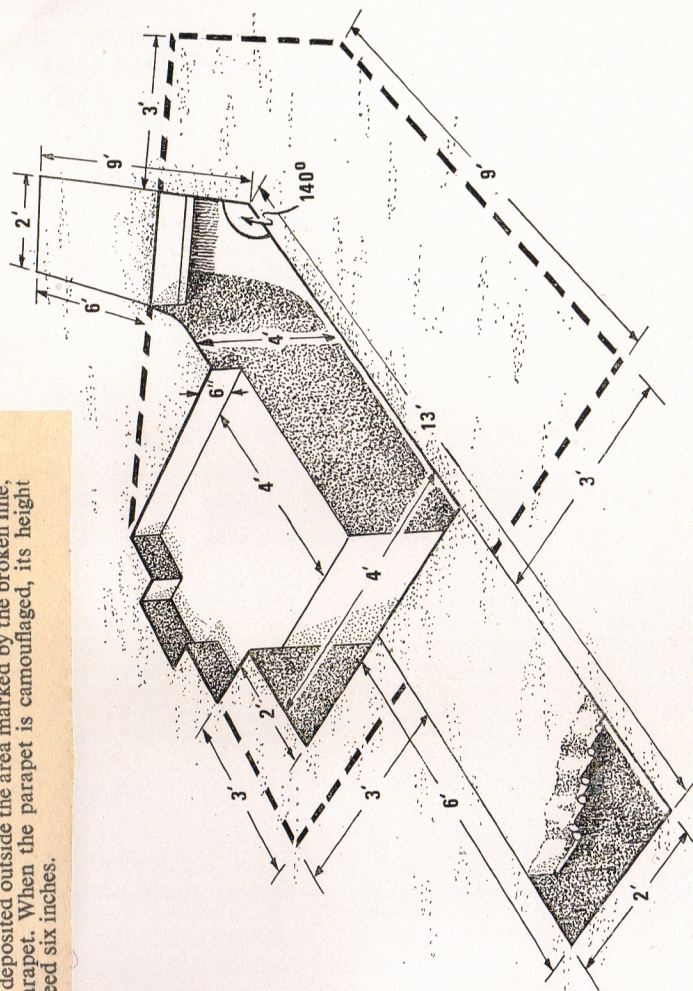


Fig 12.—Sectional view of GPMG pit (SF role)

Fig 13.—Concealed gun positions—front view



Fig 13 a



Fig 13 b

Spoil may be deposited outside the area marked by the broken line, to form a parapet. When the parapet is camouflaged, its height must not exceed six inches.



Fig 13 c

PART II—FIRE CONTROL

SECTION 1.—PRINCIPLES OF FIRE CONTROL

LESSON 9.—INTRODUCTION TO FIRE CONTROL

(To be taught to all platoon commanders and NCOs)

Aim

184. To teach the gun controller the characteristics of machine gun fire and the capabilities and limitations of the GPMG in the sustained fire role.

Stores

185. Film strip "Theory of Small Arms Fire" (No. FS 863) or, if the film strip is not available, blackboard, chalk and diagrams.

Instructor's notes

186. If the film strip "Theory of Small Arms Fire" can be shown, paras 188 and 189 should be treated as revision; otherwise they are to be properly taught as a basis for the rest of the lesson.

Approach

187. Give the aim of the lesson, and show the film strip "Theory of Small Arms Fire".

Terms used in the sustained fire role

188. Explain the terms, using selected frames from the film strip or diagrams on the blackboard:

a. *Firing of the round.* When the cartridge is fired, a rapid build-up of gases forces the bullet up the barrel. During its passage up the barrel, the bullet is treated as a rotary movement by the rifling of the barrel. The bullet leaves the barrel with a velocity of about 2,700 feet per second.

b. *Trajectory* (show diagram). When the bullet leaves the barrel, the path it follows through the air is called the **trajectory**. Two forces act on the bullet—**gravity** and **air resistance**.

Gravity causes the bullet to fall towards the ground, and thus the trajectory is curved.

Air resistance causes the bullet to slow down during flight, and thus the curvature of the trajectory becomes greater as the range lengthens.

The highest point in the trajectory is called the **culminating point**, and is reached at approximately two thirds of the range from gun to target.

c. *Cone of fire* (show diagram). Owing chiefly to gun vibrations, each round in a burst follows a slightly different trajectory. The pattern made in the air is roughly circular and is called the **cone of fire**. The majority of shots will be in the centre of the cone.

d. *Beaten zone* (show diagram). When the cone of fire strikes the ground, it forms a long, cigar-shaped pattern. This is called the **beaten zone**.

At shorter ranges, because of the flatness of the trajectory, the beaten zone is very long and narrow. As the range increases, the length of the beaten zone decreases, due to the higher trajectory and the steeper angle of descent of the bullet. The width of the beaten zone increases steadily with the range.

Should the ground on which the beaten zone falls slope downwards away from the gun, the beaten zone will be lengthened. If the ground slopes upwards, the beaten zone will be shortened.

Effect of trajectory and beaten zone on tactical employment

189. a. Owing to the flat trajectory of the gun at ranges up to about 600 metres, the machine gun is capable of laying a belt of fire 600 metres long on flat ground, the bullets never rising more than four feet above the ground. This is a valuable asset in defence.

b. As it is obviously desirable to place the length of the beaten zone along the target when engaging wide targets, machine guns are best sited to a flank where they can employ enfilade fire.

c. At ranges up to 1,100 metres the length of the beaten zone of the gun will only be reduced below 70 metres when it is striking rising ground or obstructions, or when the gun is firing from an elevated position.

190. Question the class.

Capabilities and use of the GPMG (SF)

191. The GPMG (SF) is to be employed as follows:

a. *Observed shoots*. As a direct fire weapon, to engage targets on which fire effect can be observed, ie, up to the limit of burn-out of tracer (1,100 metres) or by noting the strike. Only under exceptional circumstances should the GPMG be fired at ranges between 1,100 and 1,800 metres; for example, when the ground surrounding the target affords good observation of strike.

b. *Obscured shoots*. To engage targets in darkness or when obscured by smoke, fog or bad visibility, such targets must be previously recorded in daylight or good visibility. Such targets will normally only be engaged on the one line and elevation. However, it is at all times the gun controller's responsibility to engage the target in the most effective possible manner. Targets cannot be plotted off a map.

c. *Overhead fire*. Due to the flatness of the trajectory and the length of the beaten zone, overhead fire should not be attempted on service unless the configuration of the ground allows the gun to be sited on a high feature. Targets are NOT to be less than 500 metres ahead of our own troops, and must be within tracer burn-out range, so that safety can be controlled by observation of tracer.

192. The GPMG is neither equipped nor designed for indirect fire tasks.

Scales of ammunition for the sustained fire role

193. a. *Training*. The scale of training ammunition for the GPMG (SF) is 68,000 rounds per battalion per year.

b. *First line*. The first line scale of ammunition for the SF role is 5,000 rounds per SF kit.

Barrels

194. The GPMG (SF) kit includes two barrels. The barrel on the gun which is used in the light role should not be used to make a third for the SF role. Barrels used in the SF role should, as far as possible, be given equal wear.

(See para 39 for instructions for barrel changing.)

Rates of fire

195. a. The rates of fire are:

Normal—100 rounds per minute (half a belt).

Rapid —200 rounds per minute (one belt).

b. If rapid fire of 200 rounds per minute is used continuously, a mean barrel life of at least 12,000 rounds can be achieved, firing two barrels in rotation.

c. Barrels ^{should} be changed every 400 rounds. This is necessary to avoid overheating and to maintain equal wear of barrels. During prolonged firing the gun controller must decide, in view of the situation, whether or not the rate of fire can be reduced in order to avoid overheating of barrels, strain of working parts and excessive expenditure of ammunition.

d. The specified maximum length of burst and rate of fire are never to be exceeded.

e. In training, if continuous fire of more than 800 rounds is required, extra barrels are to be used (see para 39).

a. The best fire effect on the whole target.

b. Safety of our own troops.

c. Economy of time and ammunition.

d. Simplicity and speed.

e. Surprise effect.

Fire control orders must be framed in such a way that all these requirements are met. The system of fire control is worked out on the above basis and should be adhered to. Occasionally the situation may not permit the principles here given to be observed in their entirety, but common sense and a knowledge of how they are arrived at will enable the best fire effect to be obtained.

d. *Beaten zone* (show diagram). When the cone of fire strikes the ground, it forms a long, cigar-shaped pattern. This is called the **beaten zone**.

At shorter ranges, because of the flatness of the trajectory, the beaten zone is very long and narrow. As the range increases, the length of the beaten zone decreases, due to the higher trajectory and the steeper angle of descent of the bullet. The width of the beaten zone increases steadily with the range.

Should the ground on which the beaten zone falls slope downwards away from the gun, the beaten zone will be lengthened. If the ground slopes upwards, the beaten zone will be shortened.

Effect of trajectory and beaten zone on tactical employment

189. a. Owing to the flat trajectory of the gun at ranges up to about 600 metres, the machine gun is capable of laying a belt of fire 600 metres long on flat ground, the bullets never rising more than four feet above the ground. This is a valuable asset in defence.

b. As it is obviously desirable to place the length of the beaten zone along the target when engaging wide targets, machine guns are best sited to a flank where they can employ enfilade fire.

c. At ranges up to 1,100 metres the length of the beaten zone of the gun will only be reduced below 70 metres when it is striking rising ground or obstructions, or when the gun is firing from an elevated position.

190. Question the class.

Capabilities and use of the GPMG (SF)

191. The GPMG (SF) is to be employed as follows:

a. *Observed shoots*. As a direct fire weapon, to engage targets on which fire effect can be observed, ie, up to the limit of burn-out of tracer (1,100 metres) or by noting the strike. Only under exceptional circumstances should the GPMG be fired at ranges between 1,100 and 1,800 metres; for example, when the ground surrounding the target affords good observation of strike.

b. *Obscured shoots*. To engage targets in darkness or when obscured by smoke, fog or bad visibility, such targets must be previously recorded in daylight or good visibility. Such targets will normally only be engaged on the one line and elevation. However, it is at all times the gun controller's responsibility to engage the target in the most effective possible manner. Targets cannot be plotted off a map.

c. *Overhead fire*. Due to the flatness of the trajectory and the length of the beaten zone, overhead fire should not be attempted on service unless the configuration of the ground allows the gun to be sited on a high feature. Targets are NOT to be less than 500 metres ahead of our own troops, and must be within tracer burn-out range, so that safety can be controlled by observation of tracer.

192. The GPMG is neither equipped nor designed for indirect fire tasks.

Scales of ammunition for the sustained fire role

193. a. *Training*. The scale of training ammunition for the GPMG (SF) is 68,000 rounds per battalion per year.

b. *First line*. The first line scale of ammunition for the SF role is 5,000 rounds per SF kit.

Barrels

194. The GPMG (SF) kit includes two barrels. The barrel on the gun which is used in the light role should not be used as a third for the SF role. Barrels used in the SF role should, as far as possible, be given equal wear.

(See para 39 for instructions for barrel change)

Rates of fire

195. a. The rates of fire are:

Normal—100 rounds per minute (half rate)
Rapid —200 rounds per minute (one rate)

b. If rapid fire of 200 rounds per minute is maintained continuously, a mean barrel life of at least 12,000 rounds can be expected, firing two barrels in rotation.

c. Barrels ^{are to} ~~should~~ be changed every 400 rounds. This is necessary to avoid overheating and to maintain equal wear on barrels. During prolonged firing the gun controller must decide, on the basis of the situation, whether or not the rate of fire can be reduced to avoid overheating of barrels, strain of working parts and excessive expenditure of ammunition.

100 rounds is

196. The principles which govern the methods of applying machine gun fire are:

- The best fire effect on the whole target.
- Safety of our own troops.
- Economy of time and ammunition.
- Simplicity and speed.
- Surprise effect.

Fire control orders must be framed in such a way that all these requirements are met. The system of fire control is worked out on the above basis and should be adhered to. Occasionally the situation may not permit the principles here given to be observed in their entirety, but common sense and a knowledge of how they are arrived at will enable the best fire effect to be obtained.

Siting of GPMG (SF)

197. a. Guns in the SF role are best sited in defilade from enemy fire and able to fire in enfilade against likely enemy targets. They should be sited within or very close to a section position for protection.
- b. Owing to the high rate of fire and large beaten zone, guns in the SF role will normally be sited singly. Guns sited singly must be commanded by a trained NCO gun controller, who must be capable of controlling and directing fire by day, in daylight obscured shoots, and at night.
- c. SF guns may be grouped in twos or threes. If sited in this way, they will be under direct control of one trained NCO group controller directly responsible to the company commander. This group controller must be capable of directing, controlling and correcting the engagement of tasks ordered by the company commander, and may be a platoon sergeant.

Training of personnel

198. The number of men per unit to be trained in the SF role will be decided by the commanding officer.
199. Normally the gun team will consist of three men:
 The section second-in-command, as gun controller.
 The gunner.
 The No. 2.

In the SF role, all fire control is exercised by the gun controller. This system leaves the section commander free to command his section, but he still remains responsible for general fire direction and for the detailed siting of the gun, under the orders of the platoon or company commander.

The gun controller

200. The gun controller should be able to bring fire to bear on to any part of the target, and observation of fire will enable him to order the necessary elevation and traversing, as required. He should be in a position which allows him to control and direct fire by verbal fire control orders, either from beside the gun or, if necessary for observation of strike, from a displaced OP.

Types of target

201. Targets engaged by machine gun fire are of two types:
- a. *Point targets*—targets which have no appreciable width.
 - b. *Traversing targets*—targets which have width.

The methods of engaging these types of target are taught in Lesson 11.

Conclusion

202. Questions from and to the squad.
203. Sum up.

LESSON 10.—INDICATION AND RECOGNITION OF TARGETS**Training**

204. The methods taught in Infantry Training, Volume I—Infantry Platoon Weapons, Pamphlet No. 2—Fieldcraft (All Arms), 1954 (Army Code No. 8890), are the basis of visual training. In the sustained fire role the GPMG is fired at longer ranges, and, owing to the close grouping of the weapon, even minor inaccuracies in indication and recognition may result in the target being missed. The methods taught in Pamphlet No. 2 therefore require amplification.

Standard of training

205. The following standards of training must be reached:

a. Officers and NCOs must be capable of:

- (1) Organizing an arc.
- (2) Preparing and using range cards.
- (3) A high standard of indication.
- (4) Issuing fire control orders.
- (5) Judging distance up to 1,100 metres.

b. Gun numbers must be capable of:

- (1) Recognizing quickly and accurately any target indicated.
- (2) Indication of simple targets.
- (3) Applying fire control orders.
- (4) Judging distance up to 1,100 metres.

Indication and recognition

206. This lesson should be taught to all officers and NCOs, and during practice periods the gun numbers should also be exercised. All personnel should know how to measure in mils by hand angles, and should check their own personal hand angles at frequent intervals from every position, ie, lying down, kneeling, etc.

Instruction in recognition must only be given by NCOs who have reached a high standard in indication.

Depending upon the knowledge of the class, some parts of this lesson may be conducted as revision.

Judging distance

207. The methods of teaching how to judge distance are given in Infantry Training, Volume I, Pamphlet No. 2, Lessons 2 and 3.

208. Officers and NCOs will be required to pass the following test:

a. Judge distance to two objects not more than 1,100 metres away and not more than 300 metres from a known key range.

b. Judge distance to two objects, both between 600 and 1,100 metres.

For a. the error should not exceed 50 metres; for b. it should not exceed 100 metres. Three out of the four ranges must be judged within the permissible error.

209. Gun numbers should also be required to pass this test. Three out of the four ranges must be judged within the permissible error.

Fire control orders

210. The method of teaching the issue of fire control orders is given in Lesson 11 of this pamphlet.

211. The method of teaching the application of fire control orders is given in Lesson 3 of this pamphlet.

Aim

212. a. To teach and practise how to indicate and recognize difficult targets accurately and quickly at ranges up to 1,100 metres.

b. To practise how to organize an arc.

Periods

213. Two 45-minute periods are required; the second period should be taken out of doors, using natural targets.

Stores

214. Blackboard, chalk, landscape target, gun, tripod, and target indicator.

Instructor's notes

215. *Preparation.* Draw diagrams to illustrate the clock ray method of indication, the use of reference and auxiliary reference points, and mils measurement. For practice, the gun and tripod should be mounted, and suitable targets and reference points should be selected. *Carry out safety precautions.*

Approach

216. Explain that, if the gun controller is in the gun position, the surest way of indicating a target is for the gun controller to lay the gun on to it himself. If the gun controller is separated from the gun, he must give verbal orders.

217. Give the aim of the lesson and emphasize the importance of a high standard of indication and recognition.

Organization of the arc

218. a. Explain, or remind the squad, that:

(1) A field of fire is the area of ground upon which a gun team can bring fire to bear from a given position.

(2) An arc of fire is the area for which the gun team is responsible, and in which it is to engage targets.

b. Using the landscape target, explain that the arc is defined by a **right of arc** and a **left of arc**, which are imaginary lines passing through easily defined objects in the landscape. On occasions a **near limit** may be indicated; this implies that only the ground beyond this line and within the arc need be considered.

c. Ensure that the class know what reference points are. State that reference points are to be given short, definite names by which they can be rapidly recognized by all gun numbers, and that the range to each reference point is to be given. Reference points should not be on the right or left of arc, on the near limit, nor on the skyline.

d. Demonstrate on the landscape target how to organize an arc. An example of how this is done is as follows:

(1) "Look to your front. **Axis of arc**—where road goes over skyline. Half right, small wood—**right edge—right of arc**. Half left, prominent red house—**left edge—left of arc**. **Near limit**—river running across the front."

(2) "Reference points:

750—axis of arc—church—right bottom corner to be known as **CHURCH**.

950—quarter left—two poplars—right poplar to be known as **POPLAR**."

Preliminary to indication

219. Tell the class that the gun controller, before indicating a target, must decide on:

a. What he is going to call it, ie, what it looks like to the naked eye. (A fence may look like a dark strip, or a red house in the distance may look black.)

b. The simplest, quickest and most certain method of indication.

Direct indication

220. Explain that, if the target is unmistakable, the approximate right, axis, or left of arc can be of great assistance to denote general direction, eg:

"Right of arc—white house".

"Axis of arc—bright yellow patch".

Reference and auxiliary reference points

221. a. Show how to indicate targets by using reference points. State that auxiliary reference points may be used in conjunction with reference points to indicate difficult targets. They should be easily recognizable and should be close to the target to be engaged.

- b. Tell the class that the last target may be used as an auxiliary reference point if it is near to the new target.

Clock ray method

222. Make sure that the class is conversant with the clock ray method (*see* Infantry Training, Volume I, Pamphlet No. 2, Lesson 5).

Mils measurement

223. Explain that the distance in mils from a reference point or auxiliary reference point to the target may be of great assistance in indicating a difficult target. Remind them that, however the measurement is made, gun numbers can only measure by hand angles.

Failure to recognize the target

224. Explain that if the gunner fails to recognize the target he is to call "Again". The gun controller must then decide whether the gunner did not hear the order or whether he failed to understand it. If the gun controller considers that the gunner failed to understand the indication, he must indicate the target again by a different method.

225. Questions from and to the class.

226. Sum up main points.

Practice

227. a. Check hand angles of the squad in all positions with a prepared scale.
 b. Practise the squad in organizing an arc. Detail gun teams.
 c. With a target indicator, or a gun, point out a target to the remainder of the squad.
 d. When the squad have decided on their indication, order one of them to indicate the target. The gunners are then to lay the guns according to the indication.
 e. Check the aims and discuss the indication given.
 f. Practise the squad as above with all types of targets. The targets selected should be such as to employ the various methods of indication.

Conclusion

228. Questions from the squad.
229. Sum up main points and discuss progress.

LESSON 11.—SUSTAINED FIRE CONTROL ORDERS (To be taught to all NCOs)

Aim

230. To teach NCOs how to give a fire control order.

Class and instructors

231. Squad instructors. If the period is taken as a central lecture, practice by squad instructors should follow immediately.

Periods

232. Two 45-minute periods, followed by one or more practice periods.

Stores

233. Blackboard, chalk, drops (if available), target indicators, and landscape targets or cloth model.

Preparation

234. Write the sequence of a fire control order on a blackboard.

Revision

235. Revise the indication of targets (Lesson 10).

Approach

236. Give the aim of the lesson.
237. Explain that the following is the procedure for engaging a target:
 a. Whenever possible, the gun controller is to lay the gun on to the target. However, occasions may arise when he cannot do so; in that case he must use a fire control order to give the range and indicate a point of aim on the target.
 b. The gunner sets his sights at the range ordered, and, by using the elevating and traversing gear, directs the line of sight on to the point ordered.

Issuing fire control orders

238. Explain:

Fire control orders are given in a definite sequence, and that sequence will ensure that errors and omissions are detected immediately and that the gunner, knowing what to expect, will act quickly. The orders must be given clearly and loudly enough for the gun team to hear. The gun controller must make up his mind what is the correct order to give before embarking on it. Long and unnecessary pauses, during which he is coming to a decision as to the next part of the order, can result only in inaccuracies and slovenly drill.

The best fire control order is that which gets bullets on to the target in the shortest possible time.

Sequence

239. Explain the sequence of a fire control order:

Group.

Range.

Indication of target and "Lay".

Type of, and order to, fire.

240. Explain that, when giving out the order, pauses as necessary, and in particular as follows, should be made, to allow the gunner to act and to get ready for the next part of the order:

- a. *After giving the range*—to allow time to set the sights.
- b. *At various stages during indication*—to allow time for points to be recognized, and, when a measurement is given in mils, for angles to be measured.
- c. *After giving "Lay"*—to allow time for the gun to be laid.

Explanation of the headings in the fire control order

241. Explain each heading of the fire control order:

a. *Range.*

(1) Ranges, when ordered, are given to the nearest 50 metres, and in the following way for longer ranges:

900—nine hundred

1,000—one thousand

1,050—one owe fifty

1,100—one one hundred.

(2) Ranges should normally be obtained by estimation, but once targets have been engaged, they may be used as key ranges to assist in judging the distance to subsequent targets. A large-scale map can be used to determine ranges when the gun position and the target can be accurately plotted.

b. *Indication.* Targets are to be indicated as taught in Lesson 10. Indication should be simple and clearly given, and should be followed by the order "Lay".

c. *Type of, and order to, fire.*

(1) If no type of fire is stated, normal is implied. If it is desired to fire rapid, the order "Rapid" must be given before the order to fire.

(2) Firing will normally be ordered by the command "Fire"; however, depending on the type of target, the words "Fire" or "Go on" can be preceded by "Traversing right/left".

Orders during a shoot

242. Explain that the following orders may be given out during a shoot:

a. "Stop". This indicates to the gunner that he is to stop firing, cock the gun, apply the safety catch, check the aim and report "On".

b. "Relay". Should the order "Relay" be given after "Stop", the gunner is to lay the gun on to the noted point of aim.

c. *Corrections.* These may be ordered if the shots are missing the target, and may be for:

(1) *Elevation.* The gun controller decides on the correction required and gives it out, eg, "Add 100" or "Drop 50".

(2) *Direction.* Normally the margin of error should be small, and the gun controller gives the order "Traversing right/left, go on" until the extent of the target has been covered by fire. If the error is large, the gun controller may give the order "Go right/left clicks".

d. "Go on". The gunner continues firing as ordered.

243. Questions from and to the squad.

Target engagement—point targets

244. Explain:

A point target is a target that appears to the naked eye to have neither width nor depth, although in actual fact it must have both. For example, the target may be an enemy machine gun position covering a width of perhaps three metres, but to the gunner all that is visible may be a small patch of smoke, or dust blown about near the gun muzzle. The width of the beaten zone should be wide enough to cover the main part of the target.

245. *Method of fire.* Explain that, if the shots are effectively striking the target, no correction need be ordered. If however the first burst fired is left/right of the target, the gun controller should order "Stop" and then order "Traversing right/left, go on". The gunner then continues to traverse right/left until ordered to stop.

246. Illustrate on the blackboard how the bursts cover a point target.

247. Questions from and to the squad.

Target engagement—traversing targets

248. Explain:

a. A traversing target is a target with width, eg, a small copse, a hedge-row, a ditch or a wall. It may appear to be a straight or irregular line across the front, or it may be angled away from the gun position.

b. The target should not exceed 50 mils in width.

c. The depth of the target should not exceed the length of each beaten zone.

249. *Method of fire.* The method of engaging a traversing target is as follows:

a. The right and left limits of the target are indicated, and the gun controller then orders the gun to be laid on either the left or the right limit.

b. The gunner aims at the point indicated and reports "On".

c. When the order "*Traversing right/left, fire/go on*" is given, the gunner fires the first burst at the noted point of aim. He then traverses in clicks, firing a burst after each, until he is ordered to stop.

d. Throughout the traverse, he corrects his aim for elevation after each click.

e. If the target angles sharply away from the gun position, it may be necessary for the gun controller to give alterations to the range setting during the traverse, when he sees that the bursts are falling short of or beyond the line of the target.

f. If the order "*Relay*" is given and the gun is required to engage the target again, the range at which the sights are to be set must be ordered by the gun controller, as during the first traverse there may have been several alterations to the original setting.

250. It must be emphasized throughout that the gun controller is responsible for the effective coverage by fire of the target. This may entail ordering additional clicks left or right in order to do this.

Practice

251. Practise the squad, using the methods described in paras 245 and 249.

Further practice

252. Further practice in the engagement of point and traversing targets, using natural targets (if available), should follow.

Conclusion

253. Questions from and to the squad.

254. Sum up.

LESSON 12.—OBSERVATION OF FIRE AND RANGING
(To be taught to platoon commanders and NCOs)

Aim

255. To teach how to observe strike and how, from that observation, to apply fire to the target.

Stores

256. Blackboard and chalk, or drops, or cloth model.

Approach

257. Give the aim of the lesson, and explain:

a. Observation of fire means the estimation, by the strike of the bullets, of the position of the beaten zone in relation to the target. Ranging means the correction of elevation and direction so as to lay the beaten zone on the target.

b. Observation of fire and ranging are normally carried out by the gun controller.

c. In normal circumstances it will be possible to observe tracer at ranges up to 1,100 metres.

Observation of fire at ranges up to 1,100 metres

258. Explain:

a. During each burst of 20 rounds, four rounds of tracer are fired. These must be observed at the point of strike.

b. If the ground round the target area affords good observation of strike, the area should be watched closely to check that there is no difference between where the tracer was observed to strike and where the ball ammunition is striking.

Observation of fire at ranges over 1,100 metres

259. Explain:

a. At ranges greater than 1,100 metres the tracer will not assist in ranging. The gun controller must observe the strike of the burst round the target area.

b. It may be necessary to fire a burst of more than 20 rounds.

260. The possibility of observation of strike at ranges beyond 1,100 metres will depend on a variety of factors, of which the following are the most important:

a. *The nature of the soil round the target.* Sand, dry plough, water, chalk subsoil and any powdery surface generally give good results. Wet ground, long grass, rocky ground (except at short ranges) and undergrowth make observation more difficult.

b. *Visibility.* This may be affected by light, mist or mirage.

c. *Wind.* A high wind tends to blow away the dust caused by the strike before it can be observed.

d. *The range to the target.*

261. Enemy reaction (eg, the cessation of enemy fire) may indicate whether fire effect is being obtained. It should be realized that, in battle, the smoke and dust caused by other weapons will often impede accurate observation. Other guns may also be engaging the same target, and it may be difficult for a ~~fire~~ ^{gun controller} to identify the strike of his own gun. Correct observation of fire can only be accepted when it is definite. No action to correct for elevation or direction should be made if it is uncertain, or no more than probable. Before any deduction can be made as to the exact position of the beaten zone in relation to the target, it is necessary to decide whether only a small portion of it is giving observation, and, if so, what portion of it. For example (illustrate by diagram or drop), if strike is observed in front of the target, it may be the near end of the beaten zone falling on the target, or it may be the far end of the beaten zone falling short of the target.

262. It may sometimes happen that an area of ground close to the target is especially suitable for observation. In these circumstances it may be quicker and more economical to direct fire on this area in the first instance, correcting it on to the target as soon as strike has been observed.

263. In the engagement of traversing targets it will not always be possible to observe the strike of every burst.

264. When observing for strike, it is best to search an area round the target systematically, rather than look at the target.

265. Questions from and to the squad.

Ranging

266. Explain:

The centre of the beaten zone must be centred on the target as soon as possible after the first burst. This may entail a correction for direction, or for elevation, or both. The general principles to be observed are:

a. Only correct when it is certain that full effect is not being obtained; for instance, if there is a lateral error of less than about ten mils, it is better to traverse across the target, firing on each click.

b. When the target is on rising ground, the tendency will be to underestimate the corrections required. Where there is no guide to the amount of correction, the target should be bracketed by making a bold correction, rather than approached gradually by a series of inadequate corrections.

Corrections for direction

267. If the shots are near to the point indicated, traversing right or left will ensure that the target is fully covered. If a large error exists, the correction required can be measured accurately by binoculars or hand angles. The correction should be ordered by giving the number of clicks required on the tripod, eg, "Go right six clicks".

Displaced OP

268. When the observer is well to the flank of the gun, it must be appreciated that bullets which are falling over or short may appear to be falling right or left of the target. The observer must visualize the line gun-target and judge accordingly. (Show diagram or drop.)

Reporting strike

269. The gunner and the No. 2 must try to observe strike. They must report anything seen to the gun controller, who has then to decide on the correction required and give the necessary orders.

270. Questions from and to the squad on ranging.

Conclusion

271. Questions from and to the squad.

272. Sum up.

LESSON 13.—PRACTICAL OBSERVATION AND RANGING (To be taught to all platoon commanders and NCOs)

Aim

273. To practise platoon commanders and NCOs in observation of fire and correction of errors in elevation and direction, and to practise gun numbers in fire discipline.

Stores

274. Guns, conversion kits, ammunition, binoculars.

Instructor's notes

275. a. This practice must be conducted on a field firing range.

b. Suitable target areas must have been selected which will give reasonable observation of strike.

c. With the limited amount of ammunition available for training, it may not be possible to carry out this period. Every opportunity should be taken to practise section commanders and gun numbers whenever live practice is being conducted.

Preliminaries

276. Safety precautions. Order guns and tripods to be mounted. Indicate the arc of fire and reference points.

Approach

277. Give the aim of the lesson.

Observation of strike and making corrections

278. Order "Load", and demonstrate as follows:

a. Indicate a point target in an area within 1,100 metres. Order the squad to watch that area and fire one burst.

b. Question squad on strike:

- (1) Was it possible to determine the length of the beaten zone?
- (2) Was it centred on the target?
- (3) What corrections, if any, are necessary?

c. Adjust as necessary, and continue until the target has been engaged.

Method of practice—instructor's notes

279. a. It is important that every NCO in the infantry be proficient in fire control orders and know how to observe strike and apply corrections.

b. Gun teams are used merely to fire the gun, carrying out correctly any orders received.

c. Training ammunition must be used sparingly, and as soon as the BZ is on target the order "Stop" must be given.

d. Targets to be engaged can be indicated either by target indicators or by using the gun sights. If the latter are used, when the NCO has seen through the sights and is satisfied that he knows the target, the gun should be swung away from the point of aim.

e. Split the NCO squad to the number of guns being employed. Each sub-squad should be given the problem and NCOs should in turn be ordered to carry out the task.

f. On conclusion of each task, question the squad:

- (1) Was the target engaged?
- (2) Was the fire order given in the correct sequence?
- (3) Was it correctly delivered (ie, clearly, distinctly, without undue pauses, etc)?
- (4) If corrections were given, were they correct?

g. If it is obvious that the NCO is failing to engage the target, stop him at that point and order another NCO to take over.

h. Criticism should take place at a suitable distance away from the gun team.

280. As ammunition permits, practise the squad in fire control at point and traversing targets, first at ranges up to 1,100 metres and then at greater ranges, provided that observation of strike is possible.

Conclusion

281. Questions from and to the squad.

282. Sum up.

LESSON 14.—FIRE TASKS IN DEFENCE AND ATTACK (To be taught to all platoon commanders and NCOs)

Aim

283. To teach the tactical employment of the gun in defence and attack.

Preparation

284. Draw the necessary diagrams on the blackboard.

Revision—instructor's notes

285. Use visual aids to revise the theory of small arms fire, as applied to automatic weapons (see Section 4 of Infantry Training, Volume I—Infantry Platoon Weapons, Pamphlet No. 12—Fire Control and Theory of Small Arms Fire (All Arms), 1949 (Army Code No. 8419)), and the governing principles of machine gun fire, as set out in para 196. As each task is taught, the principles in para 196 which govern it should be emphasized.

Defensive fire (DF) tasks

286. Fire tasks can only be laid intelligently if commanders have a thorough knowledge of their use and of the characteristics of machine gun fire, ie, dangerous space, beaten zones, dangerous zones, etc. The overall fire plan for GPMGs will normally be coordinated by battalion headquarters, and company or platoon commanders will be responsible for the detailed siting of individual guns. A gun position should always be within or near a section position, for protection and communication.

287. Advantage should be taken of the flat trajectory and long dangerous space. An ideal siting would require:

- The gun to be mounted low near the ground.
- The line of fire to be across level ground or ground sloping gradually away from the gun.
- The area to be protected to be within 600 metres of the gun position.

In an ideal siting, the dangerous zone would extend from the gun muzzle to the point where the farthest bullet strikes the ground, as the shots would never rise above waist height.

288. If a fire task is to be laid at ranges over 600 metres, the effective barrier may be a little greater than the length of the beaten zone. For instance, at 1,000 metres on flat ground, a beaten zone of about 75 metres plus a dangerous space of about 25 metres gives a dangerous zone of about 100 metres.

Approach

289. Give the aim of the lesson, and state that all preparations for both types of task must normally be made in daylight.

Introduction to fire tasks in defence

290. a. *The final protective fire (FPF) task.* This task is fired across the front of the unit defended locality or along the forward edge of the battle area (FEBA) in order to give protection during darkness or to cover gaps between companies or battalions. When laying a task of this type, no deviation in elevation or line is permissible. Unless actually engaging another target, the gun should remain laid on its FPF task, so that there is a minimum of delay between the receipt of the signal for this and the gun opening fire.

b. *Other fire tasks in defence.* These include the use of the gun to engage such targets as cross roads, minefield lanes, bridges, obstacles, wire, etc, where the enemy are likely to concentrate into a narrow area. Each gun will normally have a number of such targets recorded, in addition to its FPF task.

Final protective fire task

291. Explain and demonstrate the points in the paragraphs following, using a simple cloth model or blanket board aid to bring out each point.

292. The FPF task should be laid as close to the defended locality or FEBA as is possible with safety. The safety angle required will vary, depending on:

- The ground.
- Whether friendly forces are well dug in and safe from ricochets.
- The general battle situation.

The safety angle will be decided by the officer siting the gun, but it must never be less than 100 mils; that is to say, **the barrel of the gun must never point within 100 mils of friendly forces.** It must always be borne in mind that, if bullets are striking the ground in front of, or short of, the protected position or any other part of the FEBA, the safety angle necessary to ensure that friendly forces' positions are free from ricochets is 350 mils. For peace time safety rules, see Infantry Training, Volume III—Ranges and Courses, Pamphlet No. 31—**Range Conduct and Safety Rules (All Arms), 1969 (Army Code No. 70495).**

293. The minimum safety angle of 100 mils is necessary to allow for:

- Minor inaccuracies in aiming.
- Movement as the result of the tripod settling in during firing.
- Half the width of the beaten zone.
- The possibility of strong winds blowing the shots in towards the defended locality or FEBA.

294. a. The closer the FPF task is laid to the locality to be protected, the more valuable it will be. This type of fire is of little value if opened too late or at too wide an angle, because the belt of fire may fall behind an attacking enemy.

b. A longer and more effective belt of fire can be obtained by siting guns in pairs. When this is possible, both guns should be laid on to the same point of aim, but with different elevations on the sight. Ranging is desirable, to ensure that the two beaten zones overlap.

295. Whenever the tactical situation permits, the task should be registered by firing in daylight.

296. The gun is only to be fired on the recorded line and elevation.

Other fire tasks in defence

297. Explain and demonstrate:

In addition to its FPF task, the gun may register any number of other DF tasks. Although the gun will normally be sited primarily for its FPF task, other DF tasks will also be allotted to whichever gun can best perform them. If the target is a large one, the centre (or a particularly vulnerable part of it) should be selected.

298. The gun is only to be fired on the recorded line and elevation unless it is possible to correct on observation of strike during illumination of the target area.

299. Whenever the tactical situation permits, the task should be registered by firing in daylight.

300. If the battlefield is illuminated, and it is thus or by any other means known that the gun is missing the target, alterations should be made as follows:

a. *Direction.* By clicks on the tripod.

b. *Elevation.* By adding to or subtracting from the reading for elevation on the dial sight. The number of mils required to effect a 50-metre alteration at the various ranges is contained in Column 3 on page 2 of Range Tables for Machine Gun 7.62-mm L7A1 (GPMG), 1966 (Army Code No. 14754). The new dial sight readings for the target must be noted.

301. During darkness the gun must always be manned, and gun teams must know:

a. The signal for the FPF task.

b. The rates of fire to be employed.

c. The system of communication when other DF tasks are to be engaged.

d. The targets and times of firing, if a preplanned programme of firing is to be followed. This information must be contained in a fire control chart.

Supporting fire tasks in attack

302. Guns can be used to give supporting fire to our own attacking troops. Guns selected for this role must always be positioned on the flank of the line of attack.

303. As with protective fire tasks, the safety angle between fire from the gun and our own troops must never be less than ~~100~~ ⁵⁰ mils; that is to say, **the barrel of the gun must never point within 100 mils of our own troops.** The safety angle should normally be greater than ~~100~~ mils if bullets are to strike the ground short of, or level with, our own troops (see para 292).

304. The method of determining the angle on the ground is to measure off from the enemy position the angle decided upon, and to select a prominent object on that line. When our attacking troops reach the line from the gun through the prominent object, the gun either ceases firing or is switched to fire behind the enemy position. **The minimum safety angle of 100 mils must be maintained at all times.**

305. The ground along the line from the gun to the prominent object must be visible to the gun team, so that the ceasing or switching of fire can be correctly timed. If, as a result of ground or weather conditions, this is not possible, or if smoke is used, it will be necessary to work either on a pre-arranged signal or on a timed programme.

306. Details of covering fire must always be included in the overall plan of attack.

Conclusion

307. Question the class.

308. Sum up.

LESSON 15.—THE PREPARATION OF RANGE CARDS

(To be taught to all NCOs)

Introduction

309. Explain:

Tracer ammunition will permit observation of strike up to the normal maximum range of 1,100 metres. The gun may be used at ranges up to 1,800 metres, provided that observation of strike is possible and that the target and the battle situation justify it.

Ranging is the most accurate method of ensuring fire effect, and should be carried out whenever possible.

310. The range to a target may be determined by:

- a. Range-taker. As much use as possible must be made of the company range-taker when a new position is to be occupied. A number of ranges should be taken to prominent objects within the arc of fire, and a range card should be prepared from them.
- b. Measurement, on a map of a scale not less than 1/25,000. The map must be in good condition, and the target and the gun position accurately located.
- c. Estimating from key ranges, taken by either of the above methods.

311. Ranges required should be taken from about 800 metres up to a maximum of 1,100 metres, but in desert conditions or unusually open country it may be necessary to take ranges up to as much as 1,800 metres.

Range cards

312. How to make out a range card is described in Infantry Training, Volume I—Infantry Platoon Weapons, Pamphlet No. 2—Fieldcraft (All Arms), 1954 (Army Code No. 8890), Chapter 2, Section 4 (as promulgated by Amendments No. 8). Revise this section, emphasizing the need for longer ranges in the sustained fire role.

313. Practise the squad in making out a range card, with particular emphasis on longer range targets up to 1,100 metres, and possibly including some up to 1,800 metres.

314. Questions from and to the squad.

315. Sum up.

LESSON 16.—FIRE CONTROL CHARTS

Aim

316. To teach the use of, and method of compiling, fire control charts.

Class and instructors

317. Squads under squad instructors.

Periods

318. One 45-minute period.

Stores

319. Blackboard, chalk, landscape targets, gun, tripod and dial sight, fire control charts.

Preparation

320. Mount gun. Select targets.

Approach

321. Give the aim of the lesson.

Fire control chart

322. Explain:

For night firing tasks when fire is required on more than one target, it will be necessary to record all details of each task into a fire control chart. Each target must be allotted a number.

Compiling fire control charts

323. Explain:

Fire control charts are compiled by section commanders from data obtained during daylight preparation of night tasks (*see* Lesson 6).

324. Explain each heading of the fire control chart. The chart contains all details of each task, including timings (if applicable) and rates of fire.

325. If working to a timed programme, the minimum time between ending one shoot and starting to fire another on a different target should be 60 seconds.

326. To complete the "Time" column, 24-hour clock time or "H time" may be used, not both, though an example of each is shown in the specimen fire control chart in para 328 (which is therefore, from this aspect, incorrect).

327. Although range tables are issued with each conversion kit, an extract should be included in the fire control chart.

Example of a fire control chart

328. The following is an example of a fire control chart:

FIRE CONTROL CHART						
No. Section			No. Gun			
Target numbers	Time		Angle of elevation	Angle of deflection	Rate of fire	Remarks
	From	To				
1	—	—	670	1408	R	On call FPF
2	0110	0118	813	1620	N	Two belts over period
3	H+45	H+50	822	1280	N	—

Date (Sgd) , Commanding No. Section.

1 Range in metres	2 Approximate dimensions of BZ in metres		3 Lifts for 50 metres
	Width	Length	
500—800	1½	90	1·0 mil
850—1100	2	80	1·5 mils
1150—1450	3	60	2·0 mils
1500—1750	4	50	2·5 mils
1800	4	50	3·0 mils

329. Practise the squad in compiling fire control charts.

330. Questions from and to the squad.

331. Sum up.

SECTION 2.—TRAINING TESTS—GPMG (SUSTAINED FIRE ROLE)

Conduct of tests

332. Soldiers under training should be tested by means of the training tests set out in para 337, to find out if they have reached the required standard before going on to more advanced training.

333. The various tests should be inserted in the appropriate place in the training programme.

334. Tests are a suitable conclusion to the practice periods of the various basic lessons.

335. Before testing, explain to the soldiers the test conditions. Let them ask questions. Once the test begins, do not help them any more. Always tell them the results of the tests and where they went wrong.

Grading

336. Grade men as follows:

Skilled	— 44 to 50 marks.
Above average	— 36 to 43 marks.
Average	— 28 to 35 marks.
Below average	— 22 to 27 marks.
Failed	— less than 22 marks.

Details of training tests

337. Details of the training tests are as follows:

TRAINING TESTS—GPMG (SUSTAINED FIRE ROLE)

Test No.	Subject	Stores	Conditions	Marking
1	Mounting gun and tripod.	Gun, conversion kit, drill belts, belt boxes.	Gunner and No. 2 standing beside their stores. Stores to be laid out not more than five metres from where the gun is to be mounted. Gun to be mounted in the low position on level ground. The gunner and No. 2 may assist each other in their respective tasks. Time taken from command " <i>Mount gun</i> " until both gunner and No. 2 are in the loading position.	All actions to be correct. 60 seconds or less: 10 75 seconds or less: 8 90 seconds or less: 6 120 seconds or less: 4 Over 120 seconds: NIL Deduct one mark for each mistake. HPS 10.
2	Loading, sight-setting and aiming.	Gun, conversion kit, drill belts, belt boxes, targets (landscape or natural).	Gun mounted, belt packed in belt box. Gunner and No. 2 in position behind gun. Order " <i>Load</i> "; and indicate a target. No time limit. Aim to be checked for accuracy.	All points of drill to be correct. Deduct one mark for each mistake. HPS 10.

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Test No.	Subject	Stores	Conditions	Marking
3	Preparation for night firing.	Gun, conversion kit, drill belts, belt boxes.	Gun mounted before the test begins. Indicate a target. Order " <i>Prepare for night firing</i> ". No time limit. Check that aims on both iron and dial sights are correct, that the dial sight readings are correctly recorded, and that the elevating bubble is central.	All points of drill to be correct. Allot 10 points to each number. Deduct one point for minor faults, two points for major faults. Change over and repeat the test. HPS 20.
4	Changing barrels.	Gun, conversion kit, drill belts, belt boxes.	Gun mounted, loaded with one round only, target indicated and rapid fire ordered. Order " <i>Belt expended</i> ". Time taken from that order until the barrel is changed and the gun is firing again.	All actions to be correct. Three attempts allowed, two to be correct. 15 seconds or less: 10 17 seconds or less: 8 19 seconds or less: 6 21 seconds or less: 4 Over 21 seconds: NIL HPS 10.

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SECTION 3.—GPMG (SUSTAINED FIRE ROLE) RANGE COURSE,

PART I—25-YARD/30-METRE RANGE

Introduction

338. a. The 25-yard/30-metre range course consists of five practices, designed to exercise gun numbers in the drills and skills taught in the sustained fire role. Details of these practices are given in para 345.
- b. Practices should be fired as soon as possible after the relevant lesson has been taught.
- c. Trained soldiers are to fire this course annually, and qualifying standards are set to ensure that each is competent in all his duties as a member of the gun team.
- d. The use of the gun in the sustained fire role requires the soldier to learn new drills and techniques. Every opportunity should be given to practise these drills throughout the year, particularly with those men selected as gun numbers.

Training of gun controllers

339. a. If the gun is to be used to the best advantage in the sustained fire role, fire control must be efficient. This can only be achieved by giving constant practice to all NCOs. Lessons in this pamphlet which deal with this subject should be taught before Part I of the range course is fired.
- b. *Practice in fire control.* The instructor should have a replica of the landscape on the harmonized screen and should use this to indicate to the gun controller the target to be engaged. If it is a traversing target, he must indicate the right and left limits of the target.
- When the NCO giving the fire control order has finished engaging the target, he should be criticized, but this should not be done within hearing distance of the gun numbers.
- c. This form of training is valuable at this stage in the practice of the correct sequence of fire control orders and the indication of targets by the various methods that have been taught.

Ammunition

340. a. To conserve ammunition and in order to increase the number of practices, the length of burst has been reduced.
- b. It is not necessary to engage the whole width of a wide traversing target at this stage of training.
- c. In compliance with regulations for the use of 25-yard and 30-metre ranges, all tracer is to be removed from belts before firing Part I of the range course.

Qualification course

341. The aim of Part I of the GPMG (SF) range course is to qualify gun numbers in handling the GPMG in the sustained fire role.

342. While it is not possible to list the faults which can be made by gun numbers, each test must be judged fairly; eg, where a fault in gun drill is observed which does not affect the overall success of the practice, the man must be told of the fault but need not lose marks.

343. To qualify, the trained soldier must obtain 120 points out of a HPS of 150 points.

Method of scoring

	Score	HPS
344. a. <i>Practice 1—Application of service bursts</i>	—	—
b. <i>Practice 2—Harmonization—point targets.</i>	—	30
(1) Recognition of the target	10	
(2) Point target drill	10	
(3) Handling	10	
c. <i>Practice 3—Harmonization—traversing targets.</i>		30
Score as in Practice 2	30	
d. <i>Practice 4—Obscuration of target.</i>		40
(1) Recognition of the target	10	
(2) Action on command "Stop, pick up aiming mark"	5	
(3) Adjustment of dial sight	10	
(4) Aim—telescopic sight	5	
(5) Handling	10	
e. <i>Practice 5—Preparation for engagement, and engagement, of night targets.</i>		50
(1) Recognition of the target	10	
(2) Adjustment of dial sight	10	
(3) Aim—telescopic sight	10	
(4) The engagement of the target	10	
(5) Handling	10	
	HPS	150

Details of practices

345. Details of the practices comprising Part I of the GPMG (SF) range course are given below. The following points should be noted:

- Part I should be fired, practice by practice, as the appropriate stage of training is reached.
- Landscape targets on the harmonized screen should be changed over frequently, so that fire controllers are given a greater variety of targets.

c. Details of the method of scoring are given in para 344.

d. Before any practice the gas regulator is to be set if the setting is known; if not, the gun is to be balanced on the tripod to find the best gas regulator setting (*see* Infantry Training, Volume I, Pamphlet No. 6A—The General Purpose Machine Gun (Light Role) (All Arms), 1966 (Army Code No. 70178), para 126A).

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-YARD/30-METRE RANGE

	Remarks
practice 1. Rounds are to be in three belts of 10 each. 2. The firer is to engage three aiming marks, firing a burst of 10 rounds at each. 3. All drills of loading, etc, are to be carefully noted. The firer is to be criticized for mistakes at the conclusion of the practice.	1. This practice should be fired as soon as the firer has been taught Lesson 3. 2. It should be explained that 10-round belts offer less than the normal service burst, but are used to conserve ammunition. 3. There is no scoring in this practice.

Practice No.	Practice	Target	Rounds	Detail	Remarks
2	Harmonization—point targets	Harmonized screen. For details, see Annex A.	30	Aim: To practise the firer in the drill for engaging point targets. 1. Harmonization of sights must be carried out before this practice begins. 2. The guns are to be loaded and set at the harmonized range. 3. A target is to be indicated to the firer. 4. Ten-round bursts are to be fired, altering the point of aim after each burst.	1. Bursts can be reduced, if necessary, to five rounds. 2. HPS: 30
3	Harmonization—traversing targets.	As for Practice 2.	80	Aim: To practise the firer in the drill for engaging traversing targets. One traversing target of about six clicks' width is to be indicated.	1. The MPIs of each burst will be about two inches apart. 2. This practice should be repeated if ammunition is available. 3. HPS: 30.
4	Obscuration of target.	As for Practice 2.	20	Aim: To practise the gunner and No. 2 in obscuration drill, as follows: 1. A point target is to be indicated and engaged with one burst. 2. The order "Stop, pick-up aiming mark" is given. 3. When the gunner reports "On", obscure the target and order "One burst—fire".	1. Instructors must watch the screen during the firing of each burst, in order to distinguish which burst is fired after obscuration. 2. HPS: 40.

Details of practices

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Part I of the GPMG (SE) range course are given below. The following points training is reached. frequently, so that fire controllers are

GPMG (SUSTAINED FIRE ROLE) RANGE COURSE-PART I—25-YARD/30-METRE RANGE

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Practice No.	Practice	Target	Rounds	Detail	Remarks
1	Application of service bursts.	Ochre screen for each firer with four 1" black aiming marks eight inches apart.	30	<p>Aim: To give the firer further practice in the application of service bursts.</p> <ol style="list-style-type: none"> 1. Rounds are to be in three belts of 10 each. 2. The firer is to engage three aiming marks, firing a burst of 10 rounds at each. 3. All drills of loading, etc. are to be carefully noted. The firer is to be criticized for mistakes at the conclusion of the practice. 	<ol style="list-style-type: none"> 1. This practice should be fired as soon as the firer has been taught Lesson 3. 2. It should be explained that 10-round belts offer less than the normal service burst, but are used to conserve ammunition. 3. There is no scoring in this practice.

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Practice No.	Practice	Target	Rounds	Detail	Remarks
2	Harmonization—point targets	Harmonized screen. For details, see Annex A.	30	<p>Aim: To practise the firer in the drill for engaging point targets.</p> <ol style="list-style-type: none"> 1. Harmonization of sights must be carried out before this practice begins. 2. The guns are to be loaded and set at the harmonized range. 3. A target is to be indicated to the firer. 4. Ten-round bursts are to be fired, altering the point of aim after each burst. 	<ol style="list-style-type: none"> 1. Bursts can be reduced, if necessary, to five rounds. 2. HPS: 30
3	Harmonization—traversing targets.	As for Practice 2.	80	<p>Aim: To practise the firer in the drill for engaging traversing targets. One traversing target of about six clicks' width is to be indicated.</p>	<ol style="list-style-type: none"> 1. The MPIs of each burst will be about two inches apart. 2. This practice should be repeated if ammunition is available. 3. HPS: 30.
4	Obscuration of target.	As for Practice 2.	20	<p>Aim: To practise the gunner and No. 2 in obscuration drill, as follows:</p> <ol style="list-style-type: none"> 1. A point target is to be indicated and engaged with one burst. 2. The order "Stop, pick up aiming mark" is given. 3. When the gunner reports "On", obscure the target and order "One burst—fire". 	<ol style="list-style-type: none"> 1. Instructors must watch the screen during the firing of each burst, in order to distinguish which burst is fired after obscuration. 2. HPS: 40.

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Practice No.	Practice	Target	Rounds	Detail	Remarks
5	Preparation for engagement, and of night targets.	As for Practice 2.	20	<p>Aim: To practise the gunner and No. 2 in the preparation for engaging targets at night.</p> <ol style="list-style-type: none"> 1. Order guns and tripods to be mounted. 2. Using the replica landscape, indicate two point targets to the section commander. 3. Order "Prepare night tasks". 4. When all teams are ready, order "Load". 5. Adjust the dial sight to zero, and swing the gun slightly away from the target. 6. Order "Engage Target 1 (or 2). ONE BURST only to be fired". 7. Order "Unload—clear guns", and move to harmonized screen to check accuracy. 	<ol style="list-style-type: none"> 1. Targets must be selected before the beginning of the practice. 2. Serials 4—7 in the Detail column may, if preferred, be carried out after dark. 3. HPS: 50.
		Total, Part I:	180		

SECTION 4.—GPMG (SUSTAINED FIRE ROLE) RANGE COURSE, PART II—FIELD FIRING RANGE

Aim

346. The aim of this course is twofold:

- a. To complete the training of NCOs as gun controllers.
- b. To give practice to gun teams on the field firing range.

Ammunition

347. The allotment of ammunition for Part II is expected to be about 600 rounds per section only. It is important that the ammunition be used intelligently, in order to make the best use of it.

It may be necessary to stop firing when it can be seen that the tracer is falling on the target.

The length of the burst may be reduced.

Training NCOs

348. The gun controller is the key man. He must be able to indicate targets, correct fire, and prepare night tasks if he is to be efficient as a gun controller. Officers conducting this course must plan and prepare fire tasks with a tactical picture always in mind. The NCO must be given the background to the task before the target is pointed out: eg, the position of the enemy and friendly forces; why the task is required; whether it is in defence or in support.

Criticism

349. Errors made by the gun numbers should be criticized immediately.

NCOs should be criticized on completion of the task, unless it is seen that the task is unlikely to be successful. In this event, the gun numbers should be sent away from the gun whilst the NCO is being corrected.

General

350. Before any practice the gas regulator is to be set if the setting is known; if not, the gun is to be balanced on the tripod to find the best gas regulator setting (*see* Infantry Training, Volume I, Pamphlet No. 6A—The General Purpose Machine Gun (Light Role) (All Arms), 1966 (Army Code No. 70178), para 126A).

351. For details of zeroing SF role barrels, *see* Annex F.

352. Details of the practices comprising Part II of the GPMG (SF) range course are given below:

GPMG (SUSTAINED FIRE ROLE) RANGE COURSE, PART II—FIELD FIRING RANGE

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No.	Practice	Approximate range (metres)	Rounds	Conduct of practice	Instructional notes
1	Engaging a point target.	900	50	Aim: To practise NCOs in observation of fire and ranging. 1. A supposed enemy gun position is to be pointed out. 2. The NCO is to be ordered to engage the target.	1. Any errors made by the NCO and the gun numbers should be carefully noted. 2. When the first effective burst falls on the target, the firing point officer is to order " <i>Stop</i> ". 3. Criticize the team.
2	Engaging traversing targets.	1,000	140	Aim: To practise NCOs in the engagement of traversing targets. 1. A supposed enemy position is to be pointed out. 2. The NCO is to be ordered to engage the target.	If possible, the selected target should be angled away from the gun position, so that corrections for elevation are necessary during the traverse.
3	Obscuration of the target.	1,000	60	Aim: To practise the NCO and gun team in obscuration drill. 1. A supposed enemy position is to be pointed out. 2. The NCO is to be ordered to engage the target. 3. When it is observed that the target is being successfully engaged, he is to be told " <i>Target becoming obscured by smoke</i> ". 4. The NCO must then give the necessary orders to the gun team.	1. When the obscuration drill has been completed, the order should then be given " <i>Engage the target</i> ". 2. An improvised hessian screen may be erected, just forward of the gun barrel, to simulate obscuration by smoke, once the target has been successfully engaged. Subsequent firing is to be through the hessian screen, so that gun numbers cannot use the iron sights.

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No.	Practice	Approximate range (metres)	Rounds	Conduct of practice	Instructional notes
4	Rapid engagement of targets.	1st target: 1,000 2nd target: 800	50 50	Aim: To practise the NCO and the gun numbers in the rapid engagement of targets. 1. The NCO is to be ordered to engage an enemy position. 2. Whilst the target is being engaged, he is to be ordered to direct fire on to a target at a closer range.	1. The first target should have width and should, if possible, be on sloping ground. 2. The second target should be a point target, such as an enemy gun position. 3. When the beaten zone is seen to fall on the first target, the firing point officer is to order " <i>Stop</i> ". 4. He must then point out the second target to be engaged.

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No.	Practice	Approximate range (metres)	Rounds	Conduct of practice	Instructional notes
5	Preparation for night firing including a final protective fire (FPF) task	From 700 to 1,000	50 for each of three targets (total 150 rounds)	<p>Aim: To practise the NCO and gun numbers in the daylight preparation of night tasks.</p> <p>1. The NCO is to be given one final protective fire (FPF) task and two point targets as DF tasks.</p> <p>2. He is to be ordered to prepare to engage all three tasks.</p>	<p>1. Before conducting this practice, the targets must have been selected, and the ranges obtained by range-finder or other means.</p> <p>2. Firing point officers should be prepared to discuss safety angles, etc, for FPF tasks (<i>see</i> Lesson 14) with NCOs before they commence preparation.</p> <p>3. If possible, one target should be registered by firing during the preparation.</p> <p>4. When the NCO reports that the tasks are completed, the firing point officer is to direct fire to be brought down on each target in turn. This may be done as an exercise after dark.</p> <p>5. Careful observation of fire will be necessary to check fire effect.</p> <p>6. At night several guns should be given the same tasks; when fire is ordered on a given task, it will be possible to see from the tracer if one gun is firing with incorrect settings.</p>

HARMONIZATION

Introduction

1. Before conducting Part I of the range course, it will be necessary to harmonize the gun.

Targets

2. For details, *see* Appendix A to Infantry Training, Volume I—Infantry Platoon Weapons, Pamphlet No. 12—Fire Control and Theory of Small Arms Fire (All Arms), 1949 (Army Code No. 8419), and para 209 and Plate 25 of Infantry Training, Volume III—Ranges and Courses, Pamphlet No. 32—Range Construction and Regulations (All Arms), 1958 (Army Code No. 9486).

Harmonization of sights

3. When firing at landscape targets, weapons should be given sufficient elevation to ensure that the bullets will strike the sky screen, even if the aim is on a target at the bottom of the landscape. This extra elevation necessitates the harmonization of the weapons, so that they all shoot at the same height above the point aimed at.

Harmonization is carried out as follows:

- a. Set the iron sight at 1,400 metres. Lay on one of the aiming marks, and fire a short burst.
- b. Move the sight up or down until the shots strike between the two lines.
- c. Record the elevation of each gun.

Apparatus and method of scoring

4.
 - a. *Point targets.* A measuring rod 27 inches in length is required and is used as follows:
 - (1) Hold the rod vertically, with the bottom placed on the point of aim.
 - (2) Mark the screen at the top of the rod; this indicates where the MPI should be.
 - (3) Draw a rectangle two inches wide and four inches deep, with the mark just made as its centre. Count one point for each shot within or cutting the rectangle, but no points for those outside.
 - b. *Traversing targets.*
 - (1) Mark the limits of the target as for a point target.
 - (2) Join the two marks with a pencil line, extending it by one inch at each end.
 - (3) Draw lines two inches above and two inches below the first line. Join the ends by vertical lines.

(4) Count one point for each hit inside the rectangle thus made, but no points for those outside.

c. A miniature replica (Landscape Target, Miniature Series, Code No. KS 1199) of the landscape target in use should be available on the firing point. The NCO being practised, having identified the target on the landscape, is to give the fire control order. The order should be given from a firing position without further reference to the miniature replica.

Setting up of harmonization screen

5.
 - a. It is essential for safety reasons, particularly since 10-round bursts are fired in this range course, that the MPI falls in the lower half of the bullet catcher, so that the latter can effectively perform its function.
 - b. To make certain of this, the harmonization screen (with landscape target below it) must not be set up in the ordinary target slots provided, but further away from the bullet catcher in the slope of the ricochet pit. Special slots for this purpose are provided in the standard 30-metre range.
 - c. Existing 25-yard ranges, in which these special slots are not provided, may only be used for the harmonization practices in Part I of this range course if the harmonization screen can be set up so as to meet the requirement in sub-para a. above. In practice, working from standard 25-yard range measurements, this means that the range must have a ricochet pit at least one and a half feet deep.

THE DIAL SIGHT LAMP

(Early pattern)

Dial sight lamp

1. Explain and demonstrate:
This consists of a battery box, an on/off switch at one end, and three leads. The bulb attachments are to be fitted to the sight as follows (*see* Fig 14):
 - a. Slide the dovetailed attachment on the seating on the telescope from front to rear, so that the glass inserts are directly opposite each other.
 - b. Fit one arm of the Y-shaped attachment into the rear seating from the left, ensuring that the long groove on the arm is in line with the small stud in the seating.
 - c. Put the single attachment into the front of the seating above the deflection drum and push it fully home, again ensuring that the long groove is in line with the stud inside the seating.
 - d. Care must be taken that the attachments are not pulled from the sight by means of the leads.
 - e. Practise the squad in fitting the lamp attachments.

Carriage

2. The sight is always to be carried with the light intensity control and the main switch at "Off".

Method of use

3. When the sight is required to be used at night, the following drill should be followed:
 - a. Check that the light intensity control is at "Off".
 - b. Switch on main switch.
 - c. Increase the intensity until it is possible to see the bubbles and read the dials.
 - d. When the light is no longer required:
 - (1) Turn light intensity control to "Off".
 - (2) Turn off main switch.
4. If the light has to be used again in the near future, the intensity control may be left at its last setting, and the main switch alone can be turned to "Off".

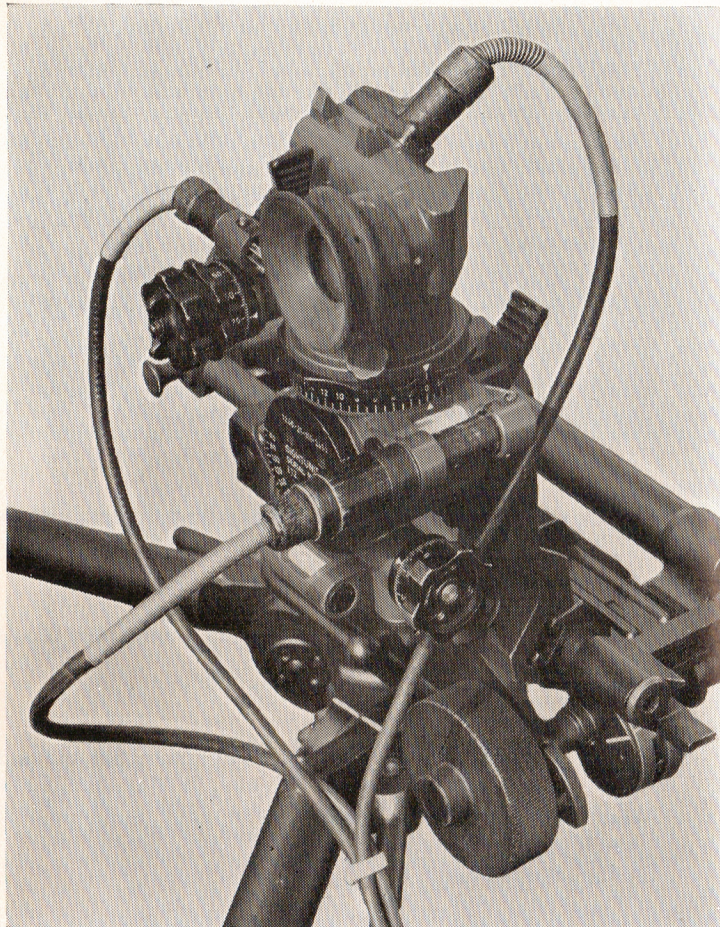


Fig 14.—Dial sight lamp (early pattern)

PREPARATION OF GUN POSITIONS FOR LATER OCCUPATION

Aim

1. To teach platoon commanders and NCOs the method of preparing gun positions for later occupation.

Stores

2. Guns, conversion kits, drill belts and belt boxes.

Instructor's notes

3. Suitable areas of ground must be selected before teaching this lesson.

Preliminaries

4. Safety precautions.

Approach

5. Explain:

There will be occasions when the gun numbers are unable to occupy a gun position during the period of dusk, eg, if the gun is required in its light role until darkness, or if sustained fire is required from another position. It will then be necessary to prepare a position in daylight, so that it can be occupied at night.

Preparation

6. Explain and demonstrate:
 - a. The section commander details the gun team required to carry out the preparation of the gun position for occupation later.
 - b. The drill for laying the gun with the gun sights will be as taught in para 134; the aiming lamp is to be used.
7. Using one of the selected targets, teach the following additional drill:
 - a. The elevation and deflection readings to the selected target must be carefully noted and recorded.
 - b. Then, using the three small pegs from the holdall, the gunner marks the site of each tripod shoe, and places the triangular tripod marker plate underneath and in the centre of the tripod position, ensuring that the corners of the tripod marker point to the sites of the tripod shoes.

c. The section commander and gun controller are again to check the aim to the target, the deflection and elevation readings, and the pegs and tripod marker.

d. The gun and tripod may now be dismantled, care being taken that the pegs marking the sites of the shoes, and the tripod marker, are not disturbed. The aiming lamp must be left in place.

Occupation of the position

8. Explain:

a. Before the position is occupied, the complete conversion kit must be collected and checked.

b. On arrival at the position, the No. 2 is to mount the tripod and, with the assistance of the gunner, locate the pegs and tripod marker. He is then to replace the tripod shoes in their former sites.

c. The gunner is to mount the gun on the tripod, as taught.

d. The section commander and gun controller are to check that the recorded elevation and deflection readings are put on the dial sight, and that the gun is laid.

e. The order "*Load*" is then to be given.

f. The No. 2 is to ensure that all the necessary ammunition and stores required are placed in position as taught (*see* para 14).

9. Practise the squad.

Conclusion

10. Questions from and to the squad.

11. Sum up.

PREPARATION AND USE OF A HAND ANGLE SCALE

1. A hand angle scale is a useful aid to practising men in mils measurement by the use of hand angles, as described in Lesson 3.

2. A suggested method of preparing such a scale is to mark on an existing building, or (if a portable scale is preferred) on a board of suitable dimensions, a vertical zero line three inches from the left end and other vertical lines every four inches to the right.

3. When viewed from ten metres away, each space between lines represents ten mils. The scale should be at eye level.

4. Men should be exercised in mils measurement from all positions, ie, standing, kneeling, etc. The arm should always be **outstretched** when using hand angles.

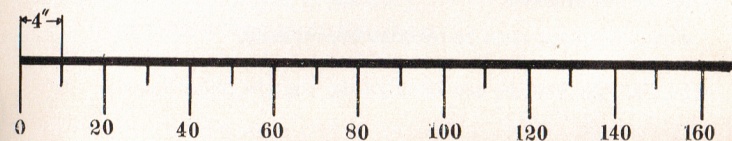


Fig 15.—Hand angle scale for mils measurement

RESTRICTED

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ANNEX E

TRILUX SAFETY

1. It is necessary to take certain precautions in the event of breakages of Trilux articles, and the user must be made aware of this.
2. Trilux items contain radio-active material.
3. No radiation is emitted, provided that the container remains unbroken.
4. In the event of breakage, the following precautions should be taken:
 - a. The escaping gas should not be inhaled.
 - b. The broken parts should not be handled with bare hands.
 - c. If breakage occurs indoors, doors and windows should be opened for five minutes to allow gas to clear. There is little danger if breakage occurs out of doors.
 - d. Any breakage must be reported immediately.
5. The dial sight and the new aiming lamp contain Trilux items.

RESTRICTED

RESTRICTED

ZEROING SUSTAINED FIRE ROLE BARRELS

Since the SF kit may be used by different gun teams at different times, it is not necessary to zero the barrels to any one individual. However, since there are two such barrels, and each is frequently in use in the SF role, it is necessary for each barrel to be reasonably accurate, and certainly essential that each barrel should shoot in the same place.

2. The zeroing of the SF barrels should be carried out on initial issue to a unit, and the zero should be checked at intervals thereafter, particularly if there is evidence of inaccuracy.
3. The procedure to follow is:
 - a. Mount the gun and tripod at 100 metres.
 - b. Set the gas regulator, or balance the gun.
 - c. Make the gunner or a recognized good shot:
 - (1) Fire a short burst off the target, to warm and dry the barrel.
 - (2) Fire one five-round burst at the target.
 - d. Find the position of the MPI, and make the necessary adjustments to correct its position. (See Infantry Training, Volume I, Pamphlet No. 6A—The General Purpose Machine Gun (Light Role) (All Arms), 1966 (Army Code No. 70178), Chapter 2, Section 1.)
 - e. Fire a check burst to confirm the zero.
 - f. Repeat the procedure, using the other SF role barrel.

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If on active service it is necessary to destroy surplus weapons so that they become unusable by an enemy, the following actions will prove effective:—

- a. Plug the barrel near the chamber or bury the muzzle in the ground; load and fire by remote control from behind cover.
- b. Strip as far as possible; bury and/or scatter remaining parts over a wide area.
- c. Retain essential parts of the mechanism that remain, such as usable firing pins.
- d. Do not neglect the disposal of spare parts.

Should the foregoing destruction drill not be possible, other methods must be devised, eg, destroying by explosive charges or by fire; running over by vehicles; scattering components in rivers and undergrowth. Unfired ammunition can be destroyed by explosives, using improvised demolition charges made up with grenades, bombs, etc.

SECTION 3.—GPMG (SUSTAINED FIRE ROLE) RANGE COURSE,

PART I—25-YARD/30-METRE RANGE

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ABBREVIATIONS

BZ	Beaten zone
FPF	Final protective fire
SF	Sustained fire

TECHNICAL DETAILS

Calibre	7.62 mm
Length of gun	49.5 inches
Length of barrel	24.87 inches
Weight—Gun	24 lb
Tripod	30 lb
Barrel	6.1 lb
200-round belt	12 lb
Sight range	200 to 1,800 metres
System of operation	Gas and recoil buffer
Cyclic rate of fire	600 to 1,000 rpm

THE GENERAL PURPOSE MACHINE GUN

(SUSTAINED FIRE ROLE)

INTRODUCTION

Aim of the pamphlet

1. The aim of this pamphlet is to provide those who are charged with the teaching of the GPMG in the sustained fire role with sufficient material to train and exercise troops in the elementary and minor tactical handling of the weapon.

Layout

2. The pamphlet is in two parts:

Part I—Gun drills.

Part II—Fire control.

The lessons are set out in instructional form, but instructors must also look for guidance to the pamphlet Successful Instruction, 1951 (Army Code No. 8670).

PART I—GUN DRILLS

Training aids

3. The film "The GPMG" (Catalogue No. C1215) should be shown to soldiers when they are about to start training with the GPMG.

Safety precautions

4. Before a lesson begins, the safety precautions must always be carried out correctly. This is particularly important in the sustained fire role, as there will be occasions when the No. 2 may be in front of the gun, setting up the aiming post and lamp.

Distribution of guns and stores

5. The scale of issue of sustained fire conversion kits is three per company. The present policy is that they will be drawn as and when required by the section which has been detailed to take on a sustained fire task. A conversion kit (see Fig 1) consists of:

One holdall, containing:

Tripod.

Triangular tripod marker plate.

Aiming lamp.

Recoil buffer.